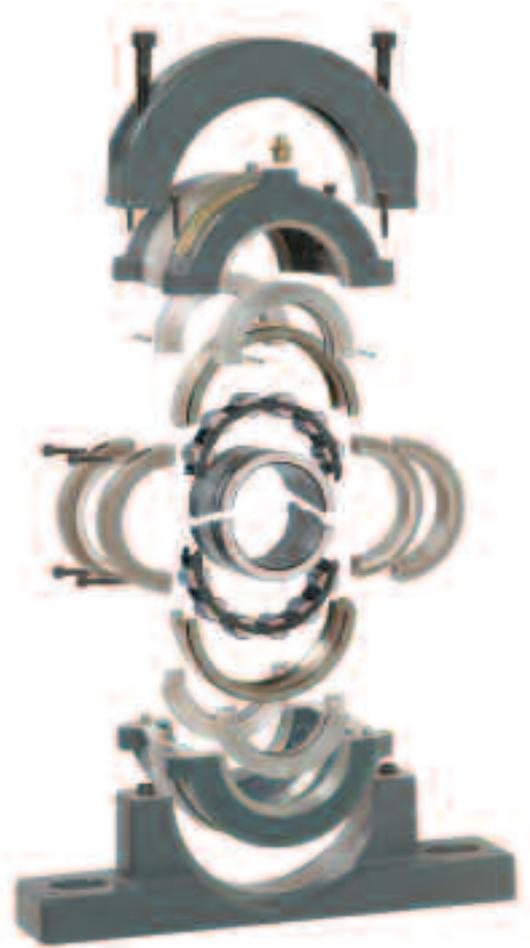




COOPER[®]



Split Roller Bearing Applications

INDUSTRY MATRIX

Applications

	Building Materials	Bulk Terminals	Cement and Aggregates	Food and Beverage	Forest Products	Grain	Iron and Steel	Minerals	Mining and Processing	Power Generation	Pulp and Paper	Refining and Petrochemical	Sugar	Water Treatment
Mechanical Handling														
Continuous Slab Casting Machines							Page 7							
Conveyors			Pages 4/5					Page 31	Pages 8/10		Page 20			
Cooling Beds							Page 24							
Elevators	Page 27		Page 8			Page 15								
Line Shafts														
Log Decks and Tables														
Overhead Cranes														
Screw Conveyor			Pages 4/5			Page 14								
Stacker Reclaimers							Page 30							
Winding Gear														
Winders									Page 17					
Haulage Gear and Winches									Pages 17/26					
Process Equipment														
Ball Mill Trunnions			Pages 2/3/32						Pages 2/3					
Ball Mill Drives			Pages 2/3						Pages 2/3					
Cane Knives and Beet Slicers													Page 25	
Carriers and Feeders													Page 25	
Crushers			Page 4											
Drum Processor Trunnions														
Dryer Rolls														
Kin and Mill Under Rollers			Page 4											
Kin and Tube Mill Drives														
Mill Drives									Page 16				Page 26	
Mixers and Agitators						Page 14					Page 20			
Press Rolls														
Reciprocating Screens			Page 21/32						Page 21					
Rotating Drums														
Shredders										Page 20				
Sugar Diffuser Drives														
Sugar Diffuser Under Rollers														
Washers														
Ancillary Equipment														
Crankshafts														
Fans and Blowers			Pages 12/13							Page 22	Page 12			
Gearboxes						Page 15	Page 32							
Heat Exchangers														
Motors and Generator Sets							Page 24/32		Page 23					
Pumps and Pump Drives														
Other Applications														
Hydro Turbines										Page 29				
Marine Propulsion Shafts								Pages 18/19						
Water Screens														Page 28
Wind Turbines														

Denotes successful Cooper application. Please refer to Page Number shown for photograph.



Unmatched Split Roller Bearing Experience and Expertise

This publication gives an overview into the variety of applications and versatility of Cooper Split Roller Bearings. Cooper Bearings has been at the forefront of split roller bearing technology since 1894 and Cooper bearings can be seen around the world in a multitude of industries and applications. The Industry Matrix shown opposite shows typical Cooper applications in some of these industries. A brief explanation of Cooper nomenclature is shown inside the back cover.

For more information, please contact your Cooper Regional Sales Manager or a Cooper Customer Service Centre.

Full contact details are shown on the back cover and on our web site: CooperBearings.com

In some instances, machinery guards have been removed for photographic purposes.

B A L L M I L L S

Picture 1

01 BCP 1016mm EXILOG GR fitted to a 10 feet diameter Silica Mill.

Pictures 2 and 3

A 28" EXILOG and GR bearing fitted to a French Aluminates Ball Mill. Speed is 26RPM and each bearing is carrying 15 tons (147kN).

Picture 4

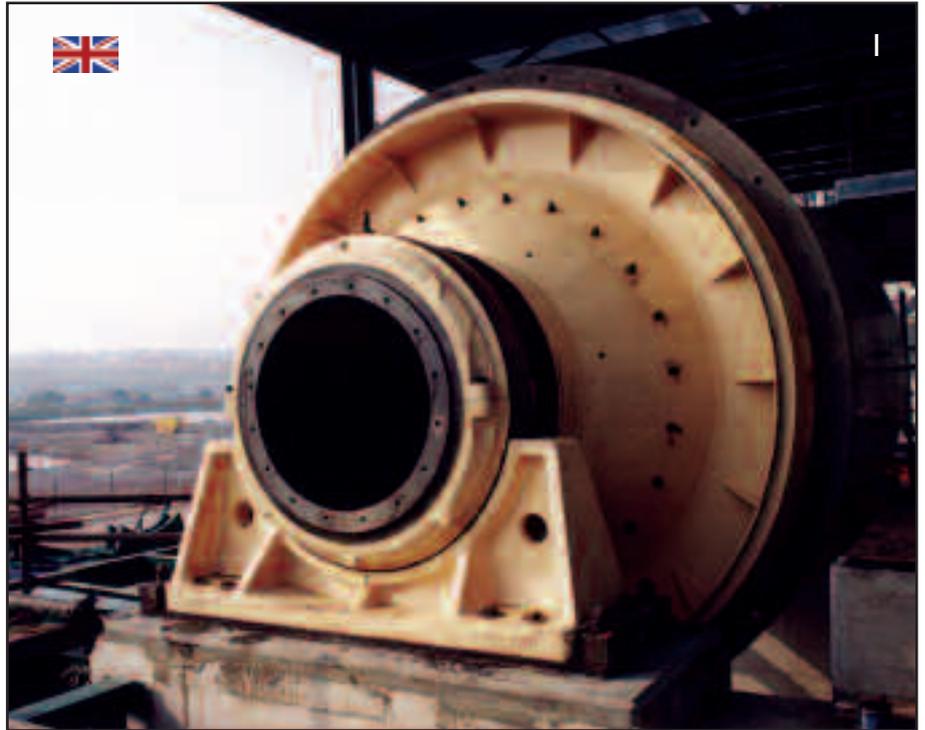
Hope Cement Works uses Cooper 280mm bearing on the trunnion shaft.

Pictures 5 and 6

Lichtenberg Lafarge use Cooper 03BCP 320mm on this ball mill.

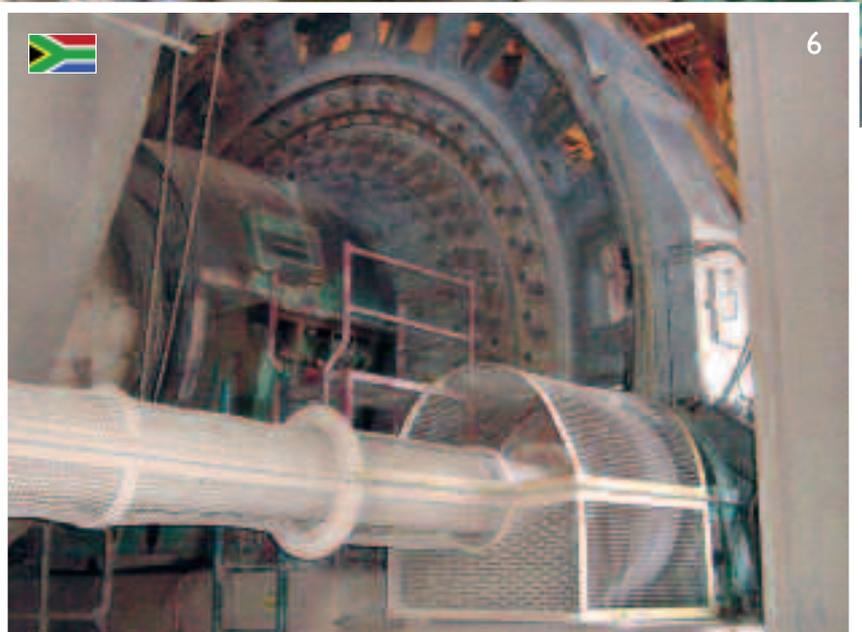
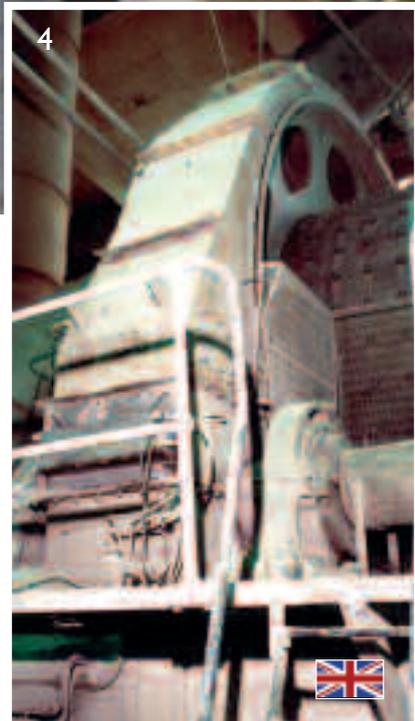
In addition to these illustrations and numerous UK applications, Cooper bearings are also used on Ball Mills in: Egypt, Greece, Ireland, USA and Turkey.

Sizes range from 01 BCP 300mm EX and GR to 01 BCP 950mm EXILOG GR



A WORLD OF INDUSTRYWIDE EXPERIENCE

B A L L M I L L S



A W O R L D O F I N D U S T R Y W I D E E X P E R I E N C E

COOPER[®]

Picture 1 and 2

Cement kiln using 10 inch 03 Series with roller thrust bearings in the cartridge end plates which support the under rollers on the kiln. The radial load is 28 tons, the axial load 10 tons and the speed is 4-5rpm.

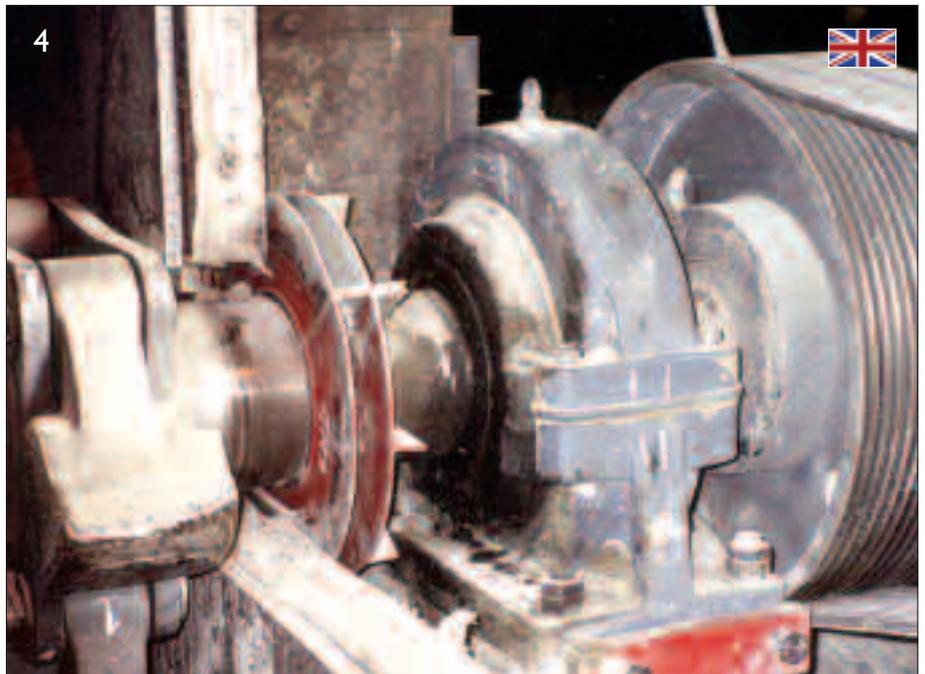


Picture 3

Cooper 01BH80mm EX hanger bearing in use on a gypsum products screw conveyor. This application also uses a 90mm version of the hanger bearing.

Picture 4

Detail of a cement works clinker breaker showing a Cooper 03BCP180mm GR. This machine also uses 03BCP180mm EX Expansion bearings.





Proven Sealing Capability

Cooper bearings are proven to operate effectively in hostile and abrasive conditions.

These illustrations show Cooper bearings covered in cement dust. Non-Cooper bearings would fail prematurely in these operating conditions

External alignment ensure 360° concentricity at all times, eliminating contamination and increasing bearing life

Cooper offer a choice of seals to suit various applications and requirements. Full details are shown in our Product Catalogue.



Environmental Comment

Cooper has no control over customer product usage or operating conditions.

These images show the extreme working conditions in which Cooper bearings are able to operate effectively and return optimum performance.

Drying Cylinders

Grease lubricated 01 BCP 180mm EX (Gunmetal Cage and C5 Clearance) and GR bearings (C3 Clearance) with High Temperature Packing Seals (HTP) were seen as the ideal solution for this customer who had major concerns over the high maintenance costs of the the previously installed sleeve bearings.

The customer has also benefited from power savings by changing from sleeve bearings to Cooper split roller bearings.

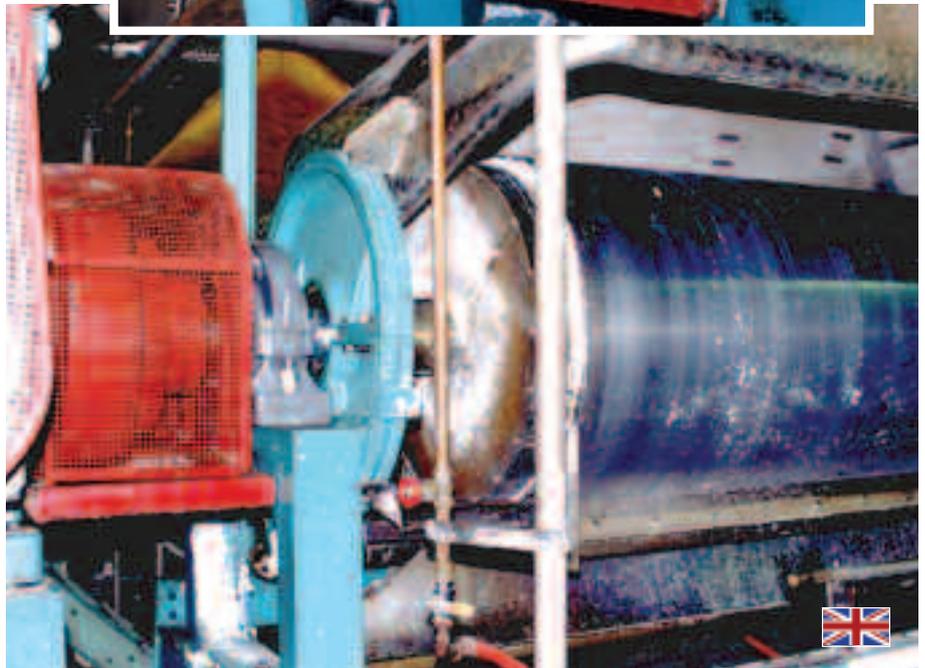
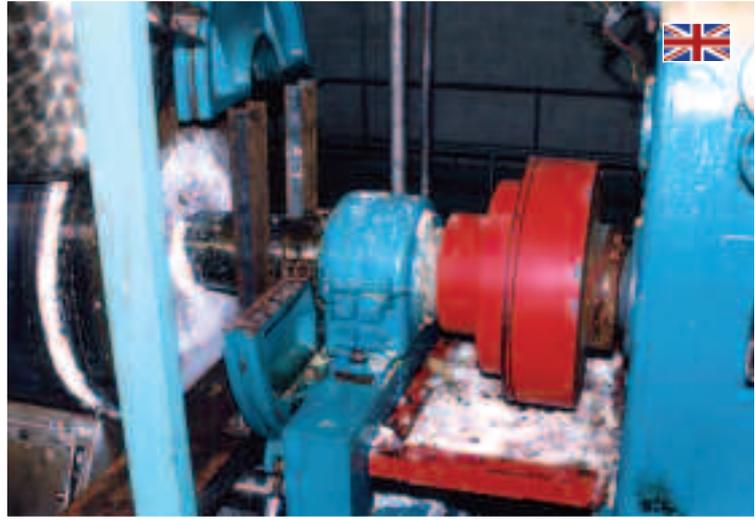
Fitted to drying cylinder suport rollers, Cooper has reduced maintenance time and maintenance overhead costs.

The split feature of the Cooper bearing permits access for inspection or maintenance without having to move any adjacent motors or gearboxes; the Cooper bearing is completely accessible in place.

The picture top right shows the drying cylinder with the sleeve bearing in place prior to conversion to Cooper:

The Cooper bearings were made to special dimensions to match the footprint of the sleeve bearings.

The conversion to Cooper is shown bottom right.

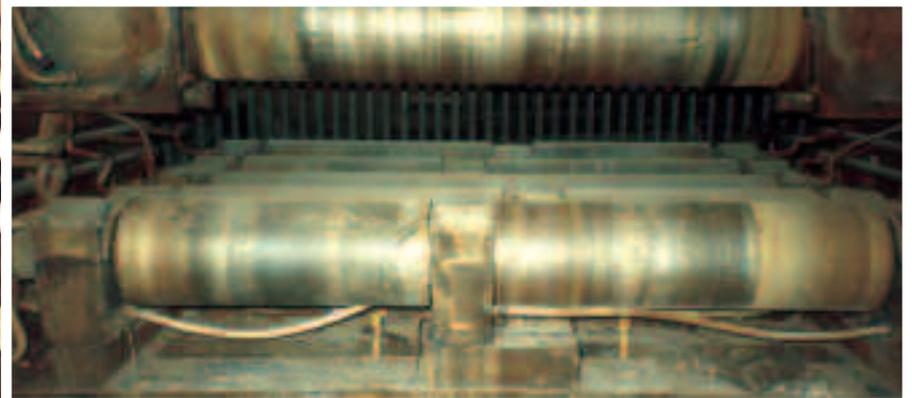
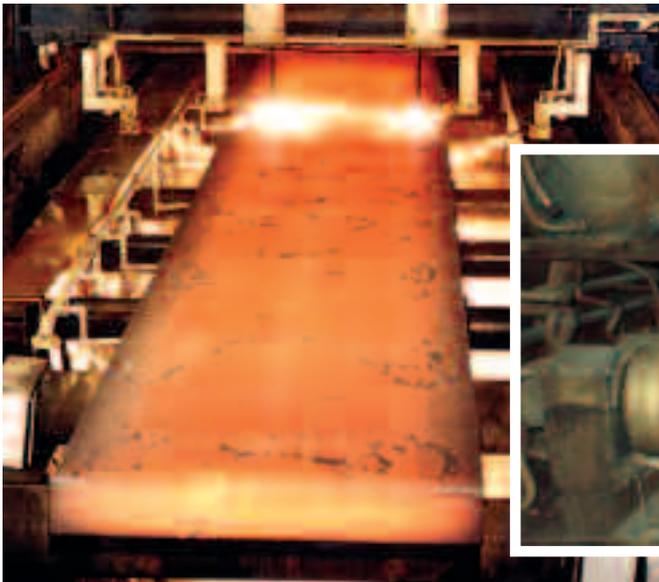


CONTINUOUS SLAB CASTER BEARINGS

Specialists in steel for decades, Cooper Bearings offer optimum performance, simple and speedy bearing inspection for preventative maintenance and immense downtime savings during inspection or replacement.

Cooper has long standing co-operation with steel producing OEM's and End Users around the world who include:

- Arcelor(Spain)
- Cockerill.....(Belgium)
- Corus.....(UK)
- CST(Brasil)
- Danielli.....(Italy)
- IPSCO.....(US)
- Krupp.....(Germany)
- Posco(South Korea)
- Sandvik.....(Sweden)
- SMS Demag(Germany)
- SMS Meer(Germany)
- Tisco(India)
- VAI.....(Austria)



A WORLD OF INDUSTRYWIDE EXPERIENCE

COOPER[®]

Pictures 1 and 2

This German Bucket Elevator uses Cooper 01 BCP 160mm GR in trapped positions. The advantages of Cooper split the shaft bearings is easily seen in these pictures.



Picture 3

This Kaolin screw conveyor is fitted with 01 BH 60mm EX bearing and uses automatic lubrication. The hanger bearing has a double carco seal to retain the lubrication and keep out the Kaolin

Pictures 4 and 5

A German chalk extraction conveyor operates in dusty, dirty and moist conditions which caused the motor and gearbox to be firmly stuck to the shaft. The main conveyor bearing failed requiring immediate replacement.

The existing 150mm bearing was replaced with a Cooper 01 BCP 150mm GR SRS. The split rubber seal was specified to combat the moist environmental conditions.



Picture 1

Cooper 01 BH 80mm EX hanger bearing in use on a gypsum products screw conveyor. This application also uses a 90mm version of the hanger bearing.



Picture 2

Over 480 Cooper bearings up to 13 inch shaft size are fitted to this raw material conveyor.

Picture 3

Take up housing (Tension Type) fitted to a raw materials conveyor at an aggregate depot uses a Cooper 01E 80mm EX (Expansion) and GR (Fixed) bearings.



C O N V E Y O R B E A R I N G S



Water collected in the tail drum pit and entered the tail drum bearings. As a result, the SNL 515 - 612 bearing fitted to the 100mm shaft failed every 2 to 3 months.

To rectify the problem, Cooper recommended a BCP 100mm GR (Fixed) and EX (Expansion) bearings.

The water penetration problem was solved by using the a Cooper SRS seal which is suitable for wet but not submerged applications. The SRS seal is available in high and low temperature versions (-20°C to 100°C).

The bearings are lubricated to Cooper specifications and have provided continuous operation for over a year (at time of printing) with no problems.



Photographs with permission of RMC Group

A W O R L D O F I N D U S T R Y W I D E E X P E R I E N C E

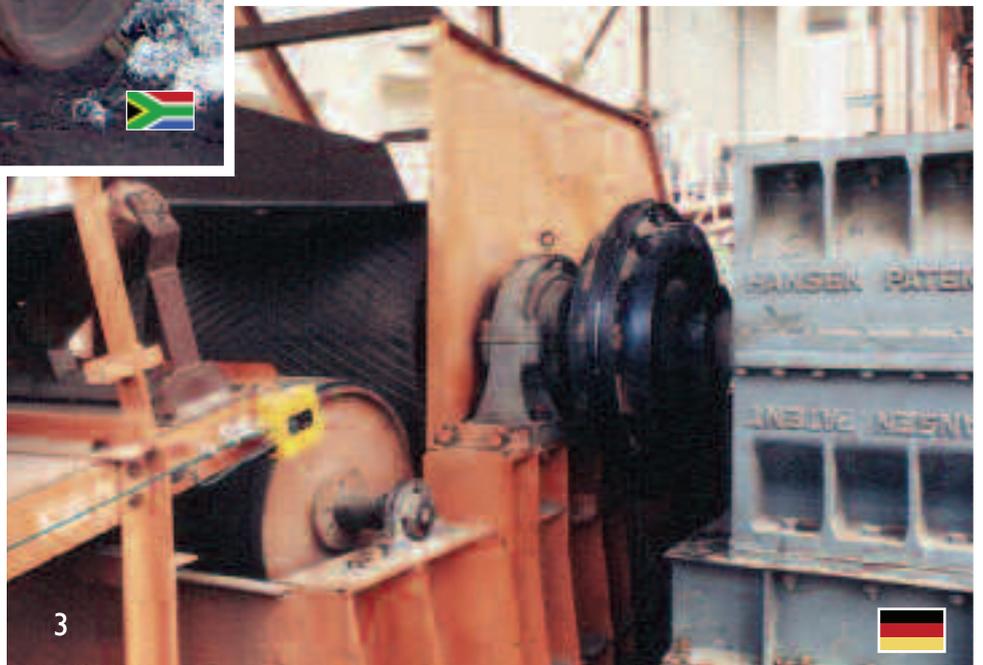


Pictures 1 and 2

01 BCTT 150mm (Take-up Tension Type) housings used on Mhlume Sugar mill.

Picture 3

Conveyor headshaft at a steel mill is equipped with Cooper 8 inch 02 Series bearings are used in trapped and open positions. 3 inch 01 Series bearings are used on the second rollers.



F A N S A N D B L O W E R S

Picture 1

Cooper 01 Series BCP on a Canadian lumber drying kiln.

Picture 2

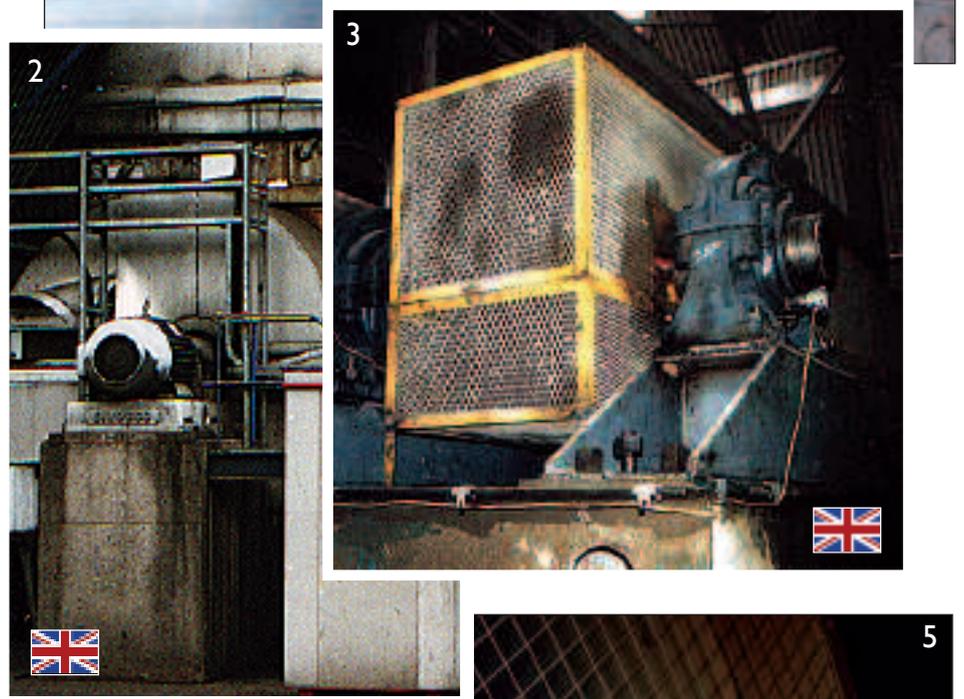
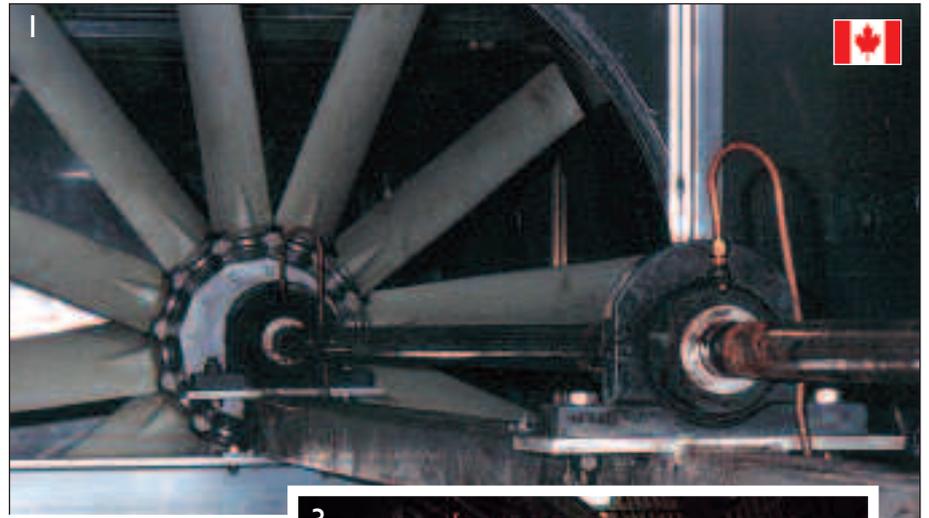
A typical power station fan application, in this instance an 02 BCP 100mm EX/GR TL S1

Picture 3

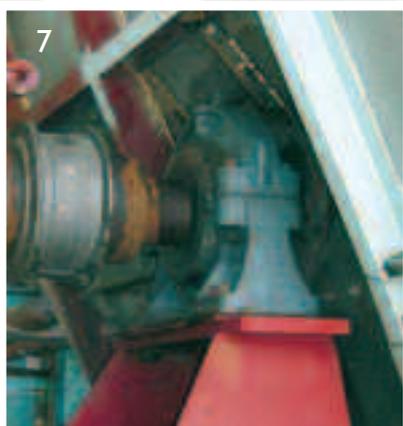
This cement works ventilation fan uses Cooper 02 BCP 900 EX TL S1 and 02 BCP 900 GR TL S1.

Pictures 4 and 5

The UK General Motors Paint Shop uses Cooper 01 BCP 75mm EX and GR bearings for fume extraction bearings.



A W O R L D O F I N D U S T R Y W I D E E X P E R I E N C E



6



8

Pictures 6 and 7

This boiler fan uses an 02 BCP 200mm TL and an 02 BCP 160mm TL on the same shaft.

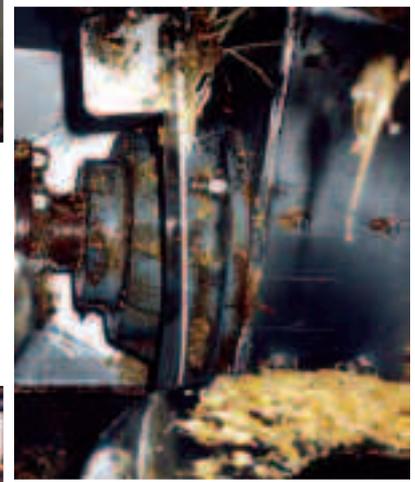
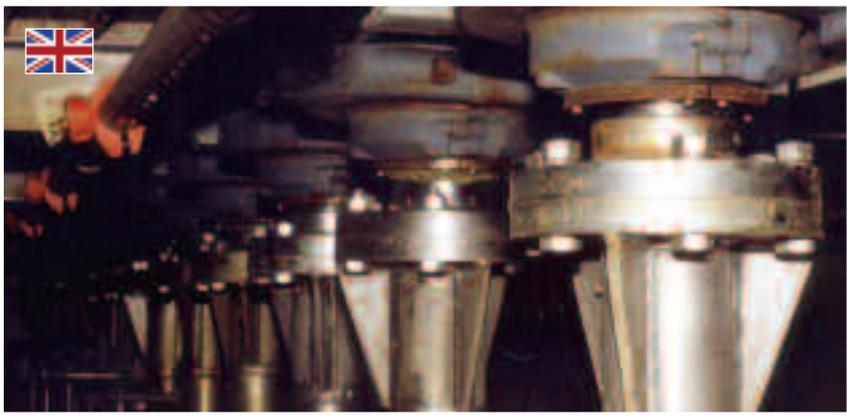
Picture 8

The lubricator equipped cement industry fan is an 02 BCP 8" EXTL.

G R A I N H A N D L I N G

The original solid bearings were replaced with standard Cooper split the shaft bearings in Flange Housings (BCF) and Pedestals (BCP) with slight modifications the housing seating area to meet with the customer's specification. This reduced the bearing change time from 1 to 2 days to 2 to 3 hours.

The germination tank high humidity lubrication problems were addressed by the combination of the Cooper external misalignment feature combined with the SRS seals which remain in complete concentricity with the shaft at all times. This keeps out foreign matter and lubrication retention is greatly improved which increases bearing life.



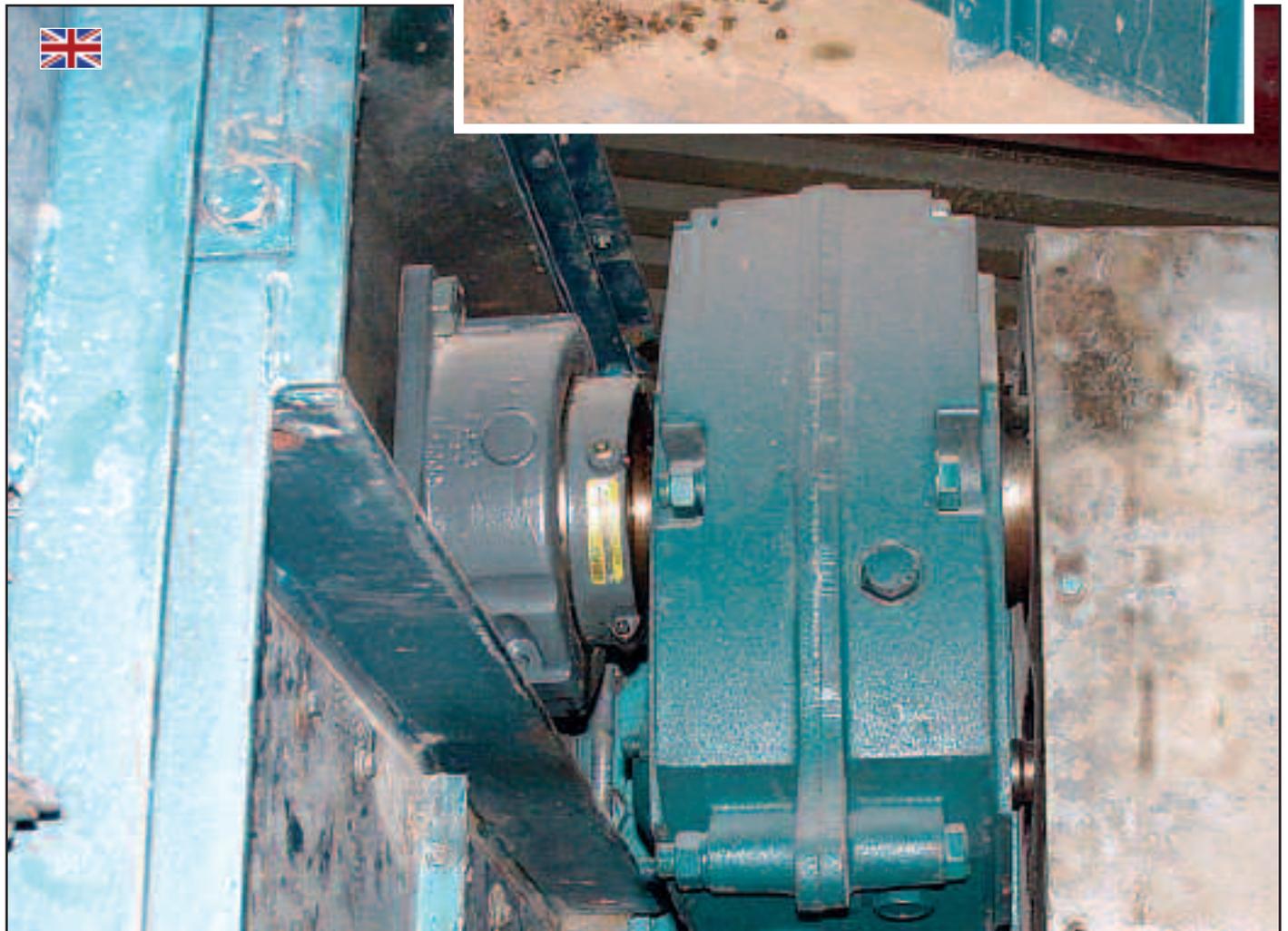
A W O R L D O F I N D U S T R Y W I D E E X P E R I E N C E



G R A I N H A N D L I N G

The previously fitted SF75/1075/75 bearings used on this 600 staggered bucket elevator had the 75mm, 106RPM drive shaft bearings fitted in trapped applications behind a 13-1 gear reduction box, which caused immense maintenance access problems.

In order to reduce the customer maintenance expense, Cooper recommended 01 EBCDFN 75mm EX (Expansion) and GR (Fixed) bearings.



Photographs with permission of W.L. Duffield and Sons Limited

A W O R L D O F I N D U S T R Y W I D E E X P E R I E N C E



LINK SPINDLES AND PILGER MILLS

Pictures 1 and 2

A Cooper 01 B 560mm Link Spindle Drive to a high speed reversing (78rpm in 2 seconds) rolling mill. The use of 01 Series bearings, double mounted in one specially manufactured housing provided the required load capacity while meeting the high speed reversal speed requirements.

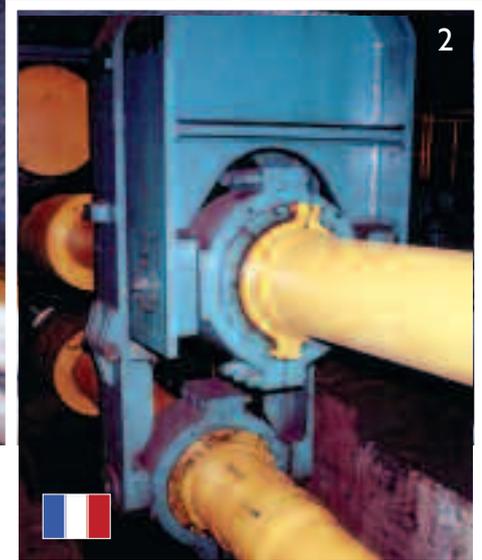
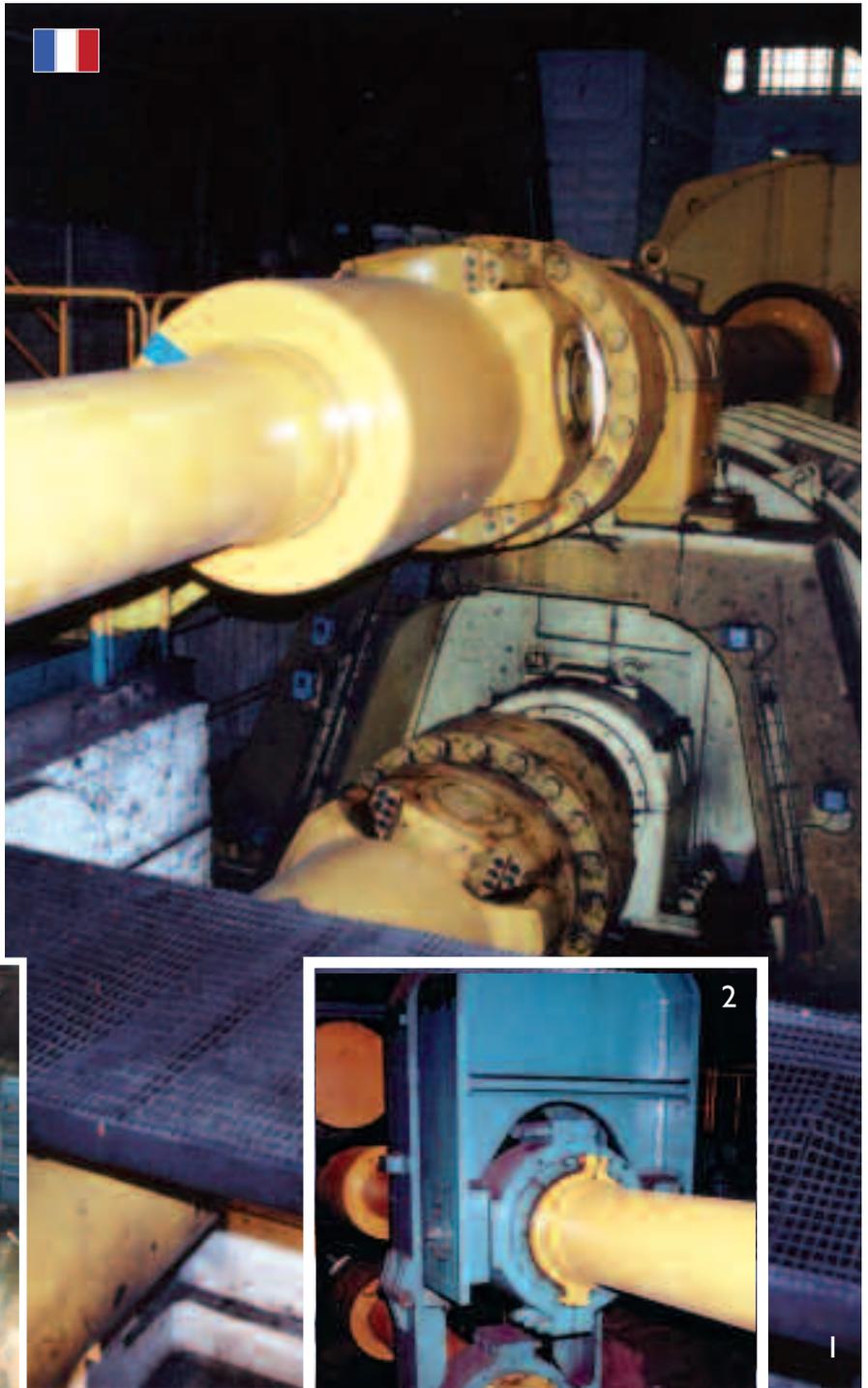
Picture 3

Assembling 01 B 600mm EX in Finland.

Cooper has a proven history of Link Spindle applications throughout the world with Spindle Support bearings from 280mm up to 775mm bearings

Pilger Mills

Cooper has global experience in Pilger Mill bearings, the smallest is an 01 B 125mm GR fitted to a German Pilger Mill, the largest application uses Cooper 03 500mm bearings, these examples are in Germany, India and Japan.



A WORLD OF INDUSTRYWIDE EXPERIENCE

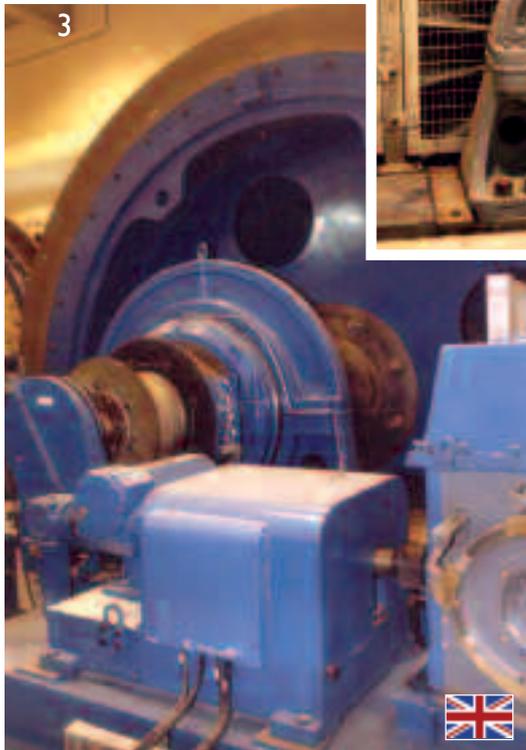
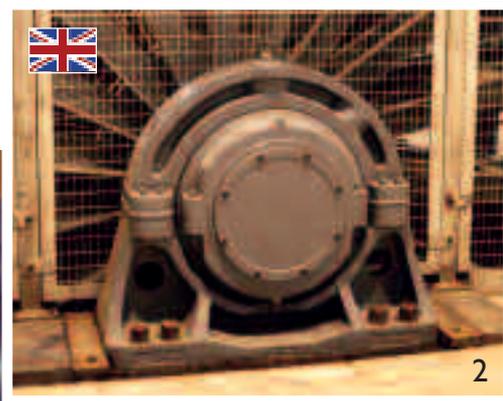
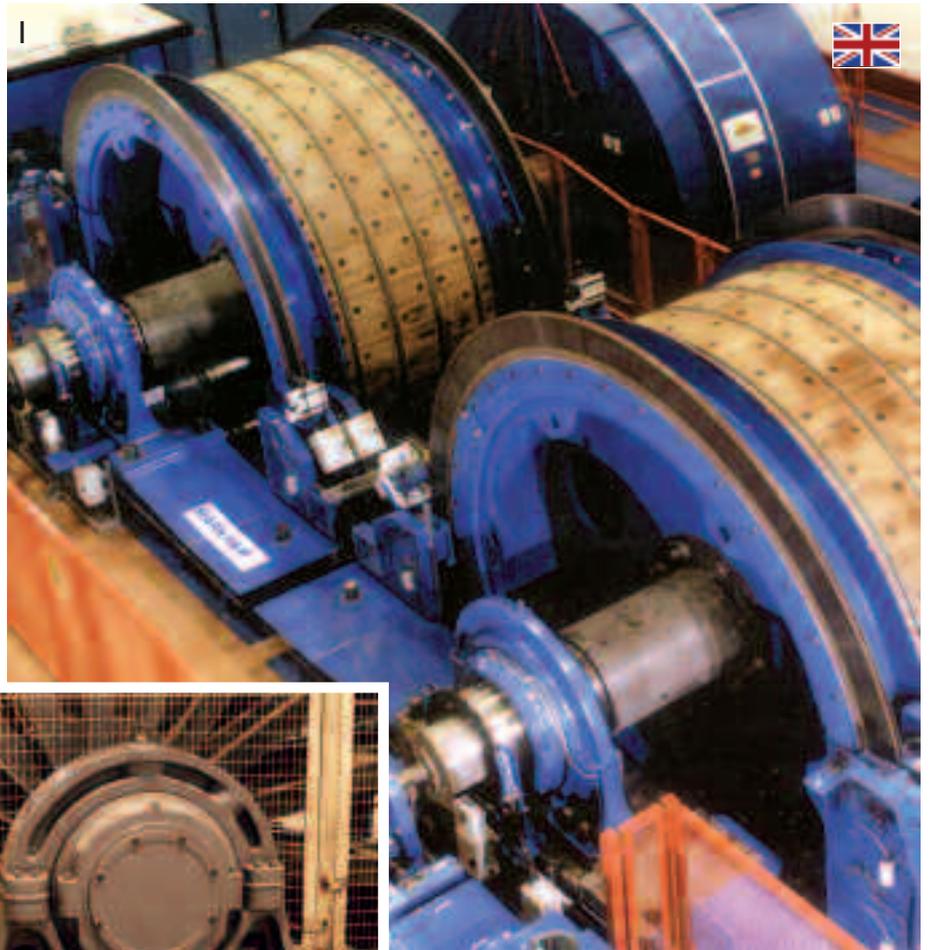
MINE WINDERS AND HAULAGES

Pictures 1, 2 and 3

Coal industry mine winders include 03 Series 600mm for an operating load of 80 tonnes per bearing at 48 rpm and 02 Series 400mm for an operating load of 32 tonnes per bearing at 31 rpm.

Picture 4

A 700mm diameter special double bearing supplied for a tower mounted winder in a copper mine. Normal operating load is 185 tonnes and the speed is 54 rpm.



A WORLD OF INDUSTRYWIDE EXPERIENCE

MARINE PROPULSION BEARINGS

Picture 1

USS Pathfinder uses an 01 BCF 800 EX bearings on the propulsion shafting. The shaft speed is approximately 800RPM.



Picture 2

This Offshore Supply Vessel is fitted out with Cooper 01 BCP 500 EX and 02 BCP 500 GR on the propulsion shaft.



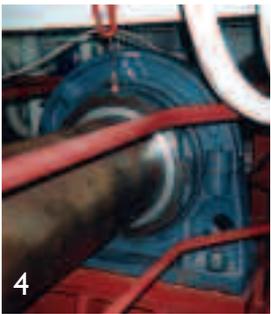
Picture 3

'Dae A Express' high speed ferry use 01 BCP 120mm EX and 01 BCF 120mm EX on waterjet drives.



Picture 4

A typical installation of a Cooper BCP in a propulsion shafting application.



Picture 5

Omani Navy Frigate uses 02 BCSPS 340mm EXILOG on the main propulsion shaft. Steel housings are specified to withstand high shock loads



A WORLD OF INDUSTRYWIDE EXPERIENCE



MARINE PROPULSION BEARINGS

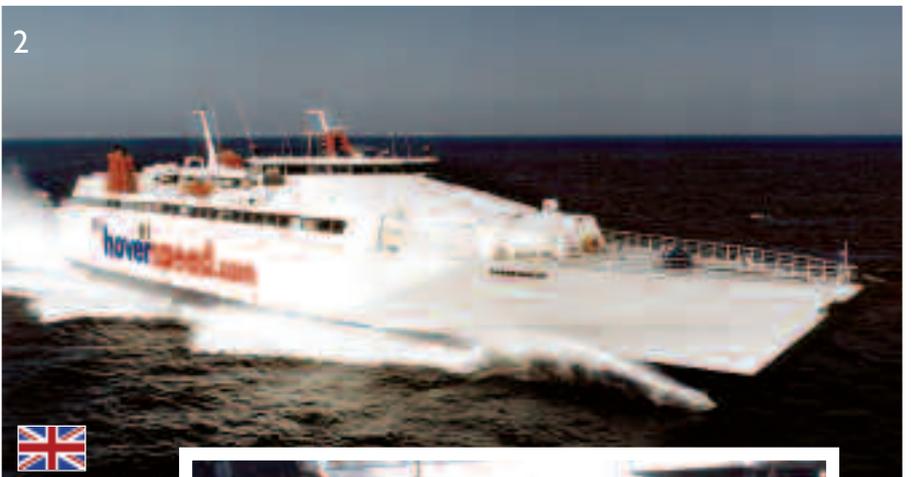
Picture 1

Each of the 3 Hellenic Navy Super Vita Class uses 2 Cooper 01 BCPN 135mm EX ATL bearings on its propulsion system. Nodular castings are specified as they are able to withstand greater shock loads.



Picture 2

Hoverspeed Super SeaCat is fitted with weight saving aluminium 01 BCAPLA 210mm EX Cartridges and Pedestals.



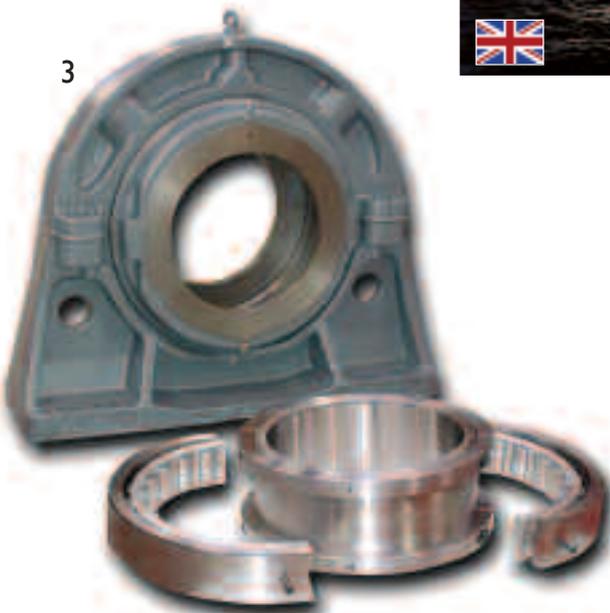
Picture 3

01 BCPAPA 440mm EXILOG bearings specified for the Japanese SuperTechno Liner twin 27MW gas-turbine driven waterjet systems.

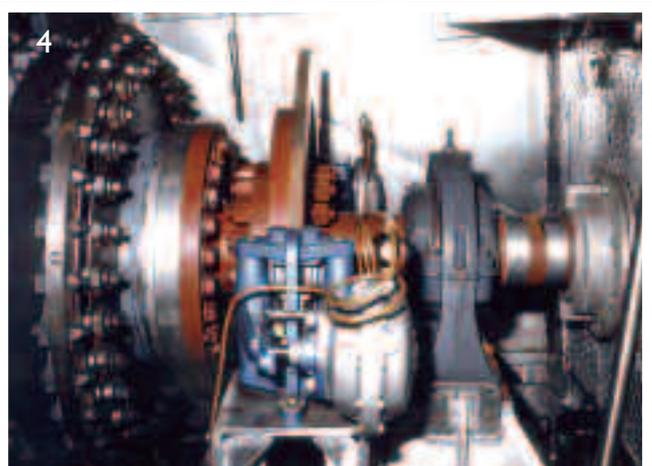
Picture 4

A typical Waterjet drive trapped position utilising a 240mm BCP EX with felt seals.

3



4



A WORLD OF INDUSTRYWIDE EXPERIENCE

COOPER[®]

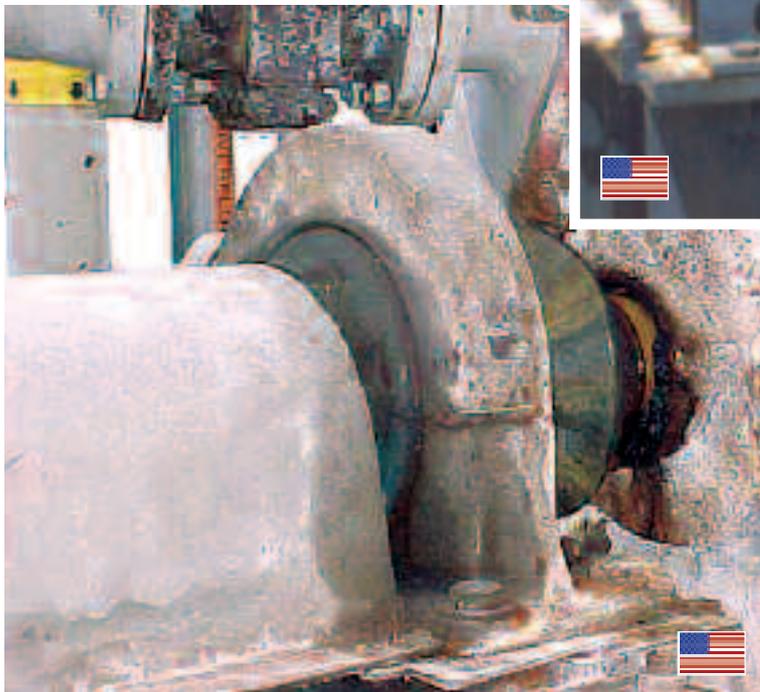
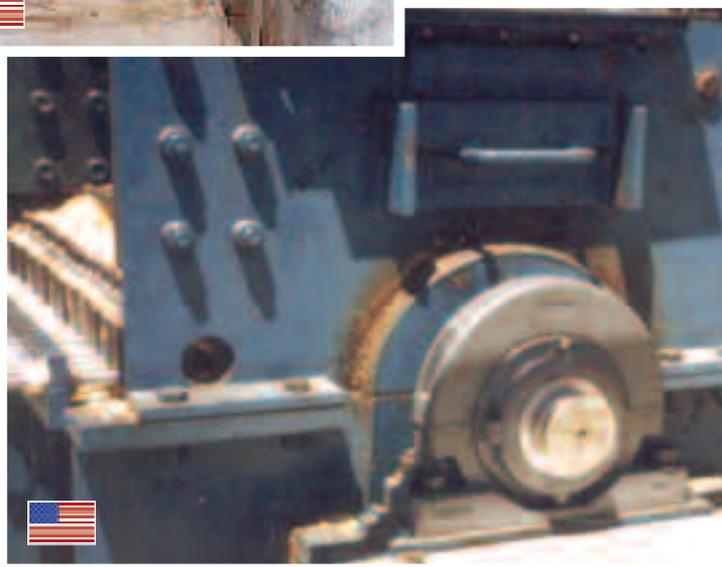
Agitators, Mixers, Conveyors, Chippers & Debarkers and Saws

Trapped 01 BC 315 EX ATL and 01 BC 415 EX ATL bearings are shown in use on agitators in the paper industry.

The Aluminium Triple Labyrinth Seal used in this application, combined with the recommended full pack grease, prevent water intrusion in the event of stuffing box failure. If there is a stuffing box failure, downtime is kept to a minimum as the split to the shaft feature permits easy replacement and inspection in the shortest possible time.

Prior to the installation of Cooper bearings, the plant was frequently shut down to replace flooded bearings.

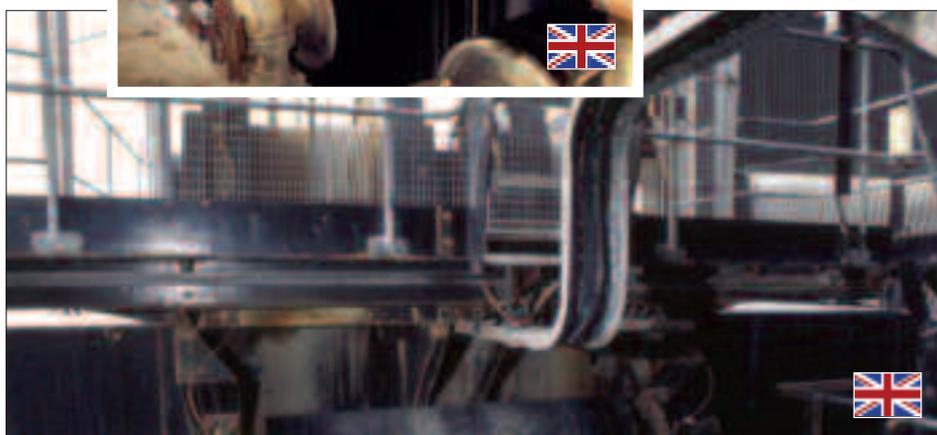
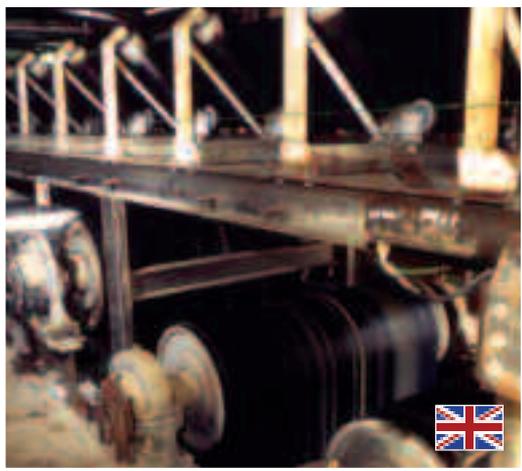
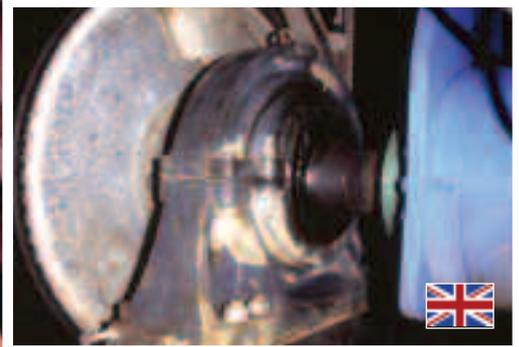
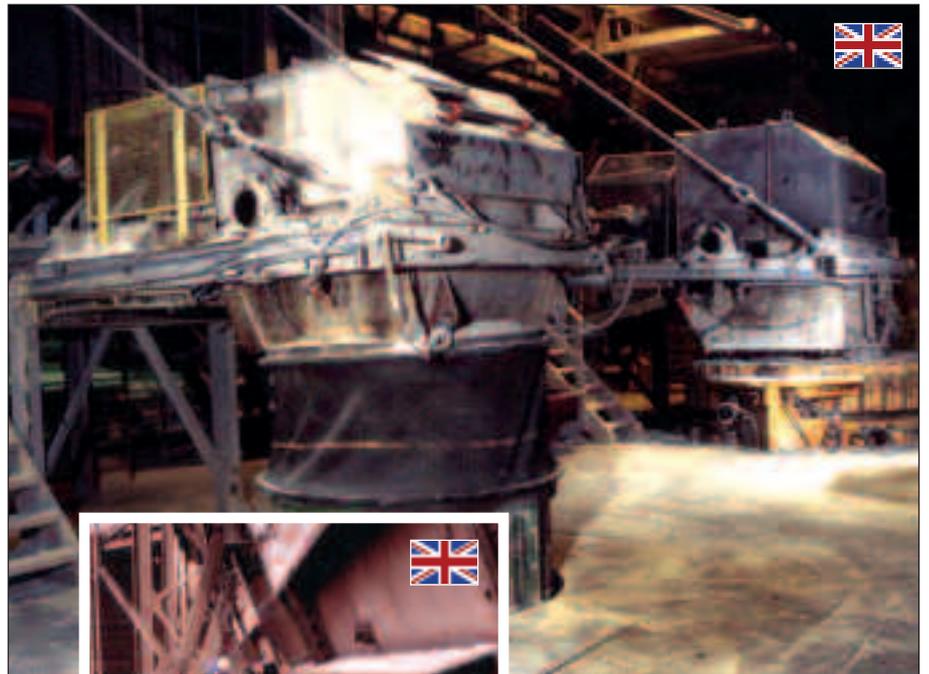
Also shown are Cooper applications on Chippers, Conveyors and Saws.



Q U A R R Y I N D U S T R Y B E A R I N G S

Quarrying Applications

Cooper bearings are fitted to numerous applications in the quarry industry ranging from ball mills to conveyors, crushers, under rollers and reciprocating screens.

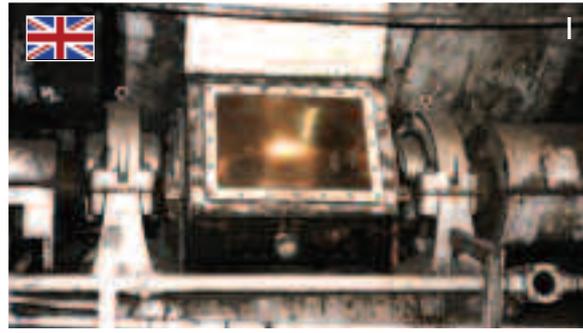


A W O R L D O F I N D U S T R Y W I D E E X P E R I E N C E



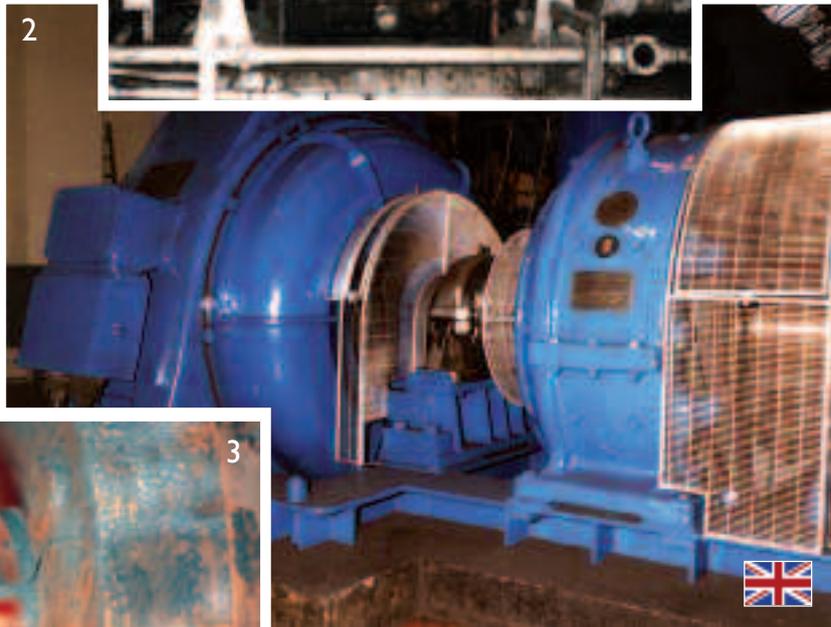
Picture 1

Power station Briquette making plant



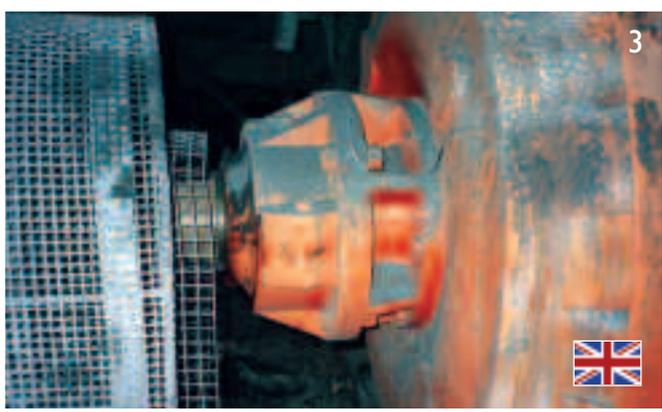
Picture 2

Motor Generator Sets



Picture 3

Coal Mill bearing conversion from a Whitemetal bearing.



Picture 4

Power Generation trapped application



Picture 5

Ventilation fans. More fan types are shown in the Fan and Blower section.

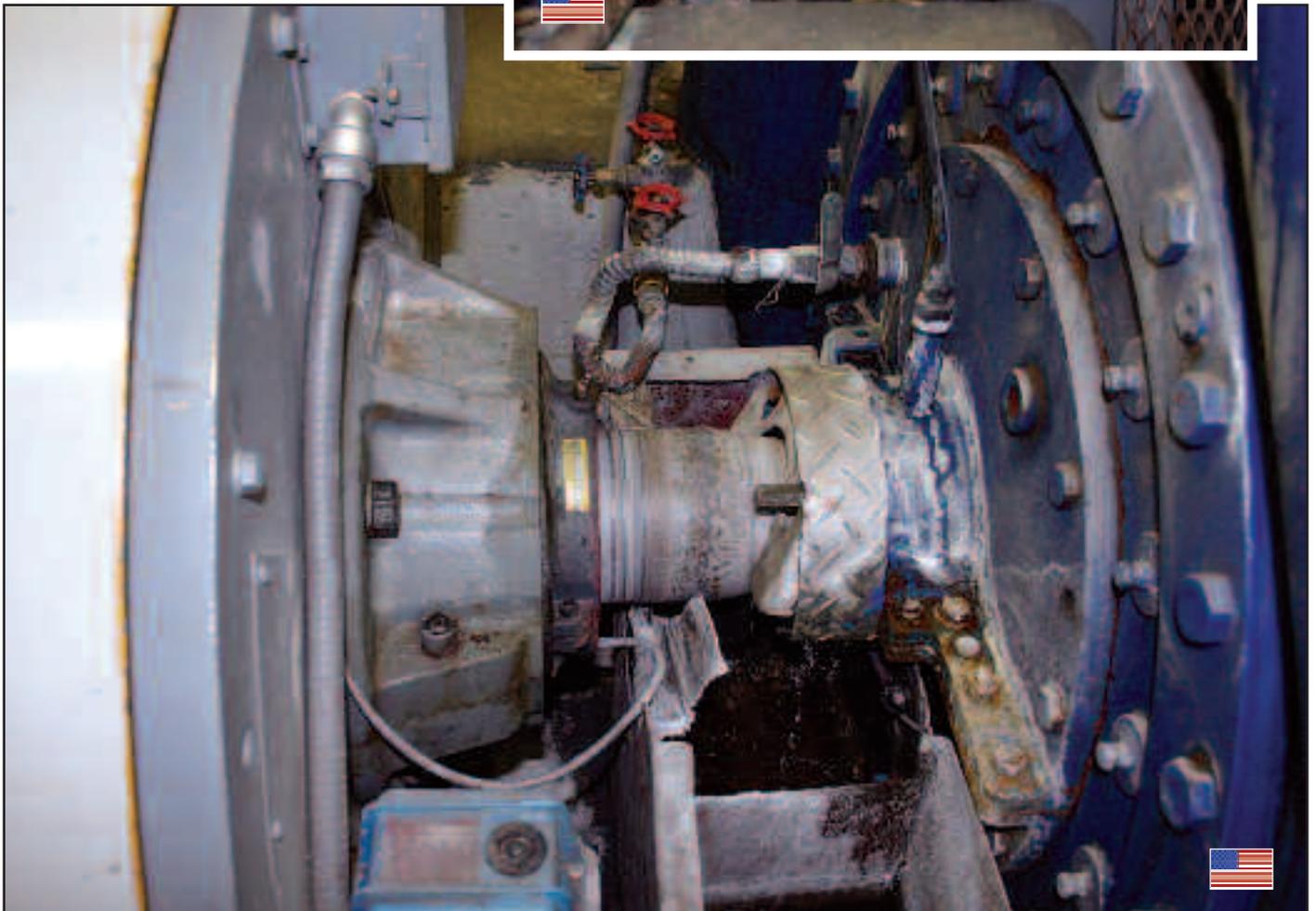


Irrigation Generator Sets

Running at 1200RPM, these 01 BCF 508 EXTL Flange bearings has saved the customer days of maintenance downtime installing new bearings on these water powered generator sets.

The continually damp and sometimes very wet environment required the specification of ATL seals to prevent water penetrating the bearing.

The use of ATL seals provides optimum bearing life and excellent lubrication retention for this application.



Picture 1

Steel industry rolling mill drives use High Rise Pedestals (PH) for the 02 BCPH 750mm and 760mm for the electrical specification Cooper bearings which are manufactured to comply with the electricity supply industry specifications.



Pictures 2 and 3

Cooling Bed drive mechanism utilising 200mm 01 Series BCP's.

Picture 4

The turnover mechanism for a Cooling Bed features 01 Series 170mm BCP Cooper bearings.





Pictures 1 and 2

This South African sugar mill is fitted with many Cooper bearings which use various types and sizes of Cooper bearings.

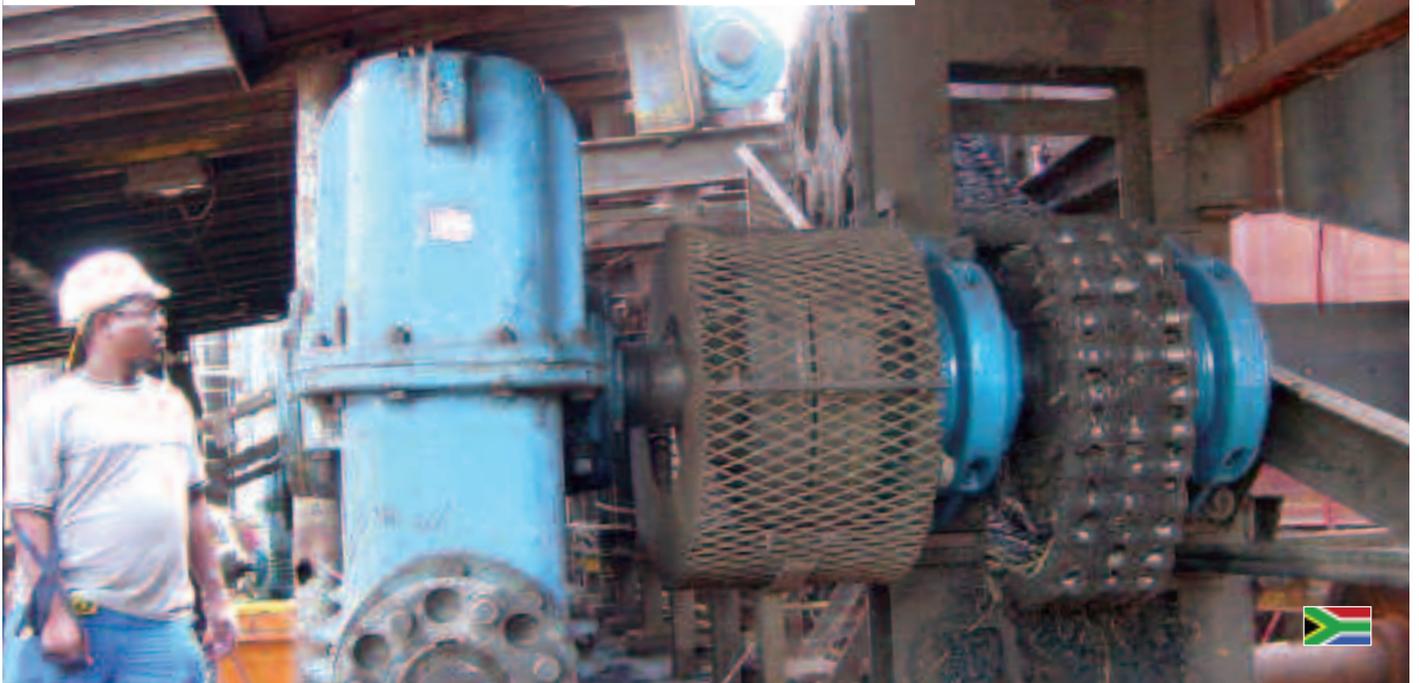
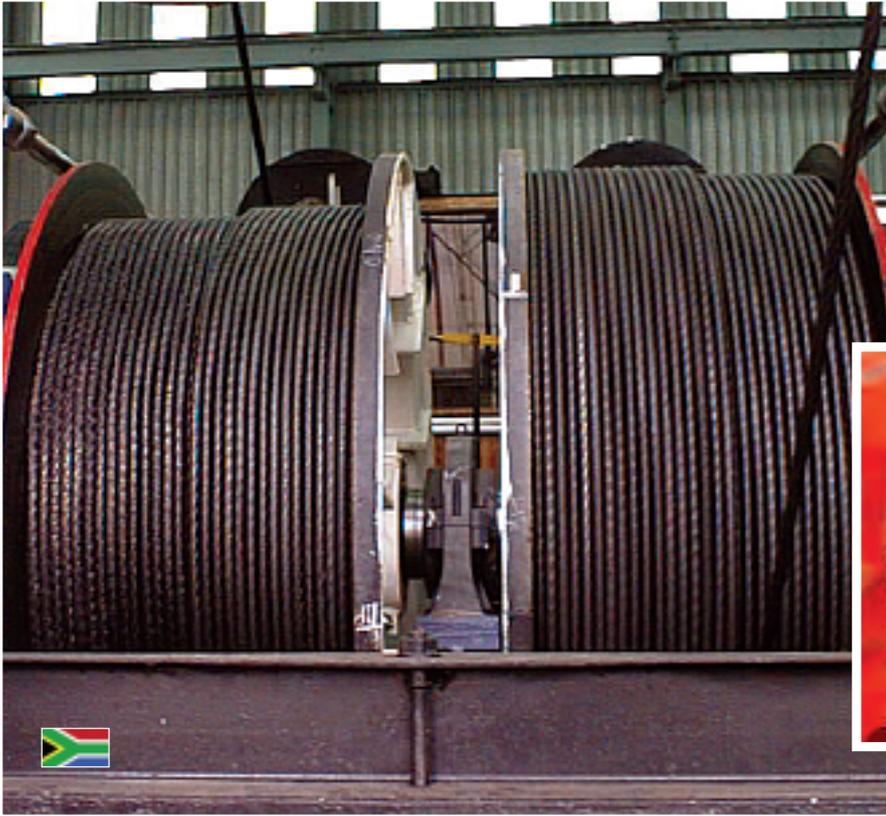
Picture 3

The cane knives are fitted with 03 BCP 200mm EX (Expansion) and GR (Fixed) bearings.

Trapped Positions

Many photographs throughout this publication illustrate trapped bearing positions.

Cooper users save a great number of maintenance and downtime hours in addition to vastly increasing production hours and uptime.



Ashphalt Plant

This application is a conversion from a Solid 'Self Lube' (shown lower right) to a Split to the Shaft 01E 65mm GR Cooper SN Compatible Pedestal.

The customer required a maximum operating temperature of 100°C on this inclined 62 bucket elevator. The load capacity of the elevator is 1500kg. This is a typical 'trapped application that is eminently suited to Cooper split bearings.



Picture 1 and 2

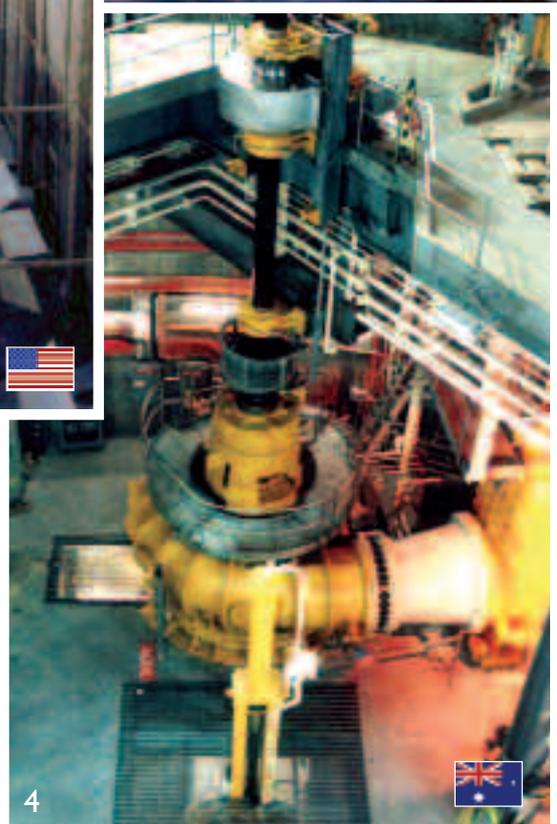
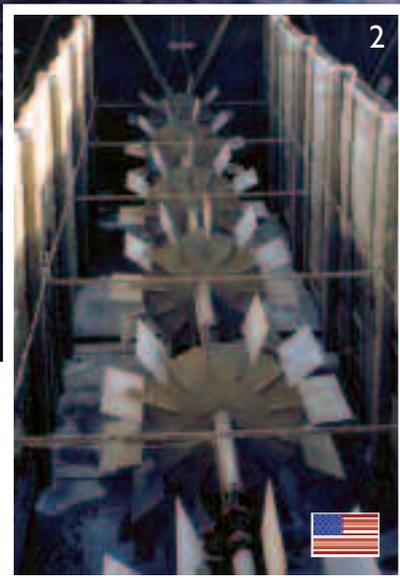
The use of Cooper bearings in Flocculator Basins has seen widespread use due to the excellent sealing qualities of ATL seal when operated in submerged conditions. This is one of the many sealing options available with a Cooper bearing.

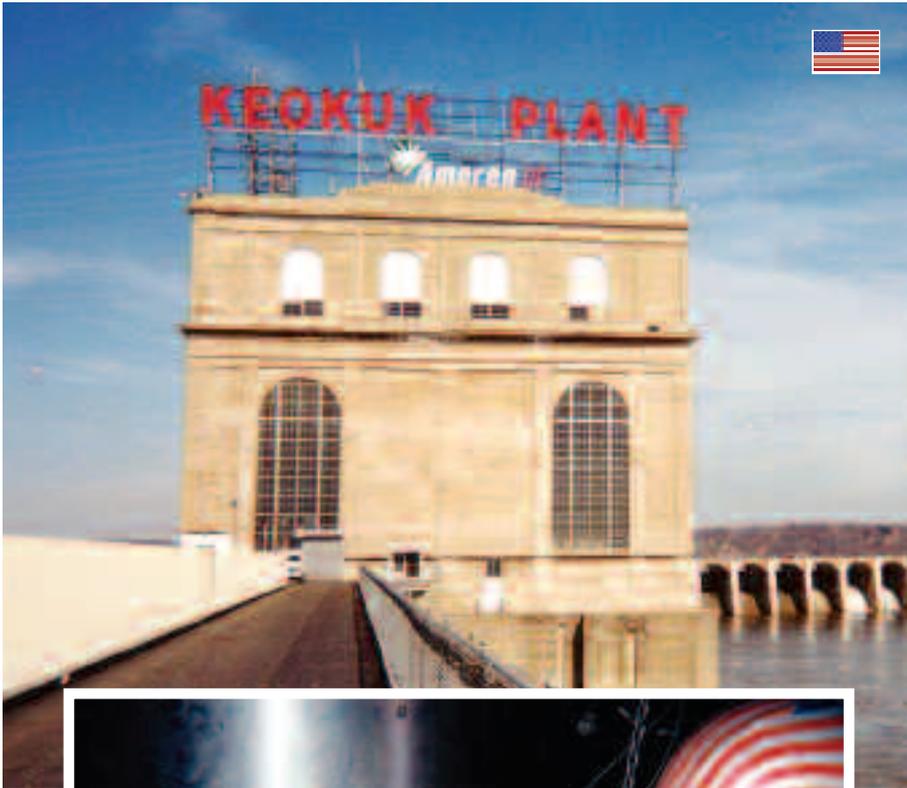
Many water companies use up to 140 Cooper BCP's in sizes from 2 7/16" to 4 7/16".

Temperatures vary from 32°F in winter to 70°F in summer. A food grade grease is usually specified for this application.

Pictures 3 and 4

Melbourne Water Company uses oil lubricated Cooper CT13832 special 12 1/2" combined radial and thrust bearing on top vertical pump shaft bearings. The upper shaft centre bearings are 02 BCFS 300mm EX and the upper shaft lower bearing is an 02 BCPS 300mm EX.





Hydro Turbine

02 BCF 2500 EX fitted to a Hydro Turbine vertical shaft. The customer chose Cooper for ease of installation and inspection. The elimination of oil lubrication was also a bonus for the customer as they could comply with environmental legislation.

Further Turbine Applications

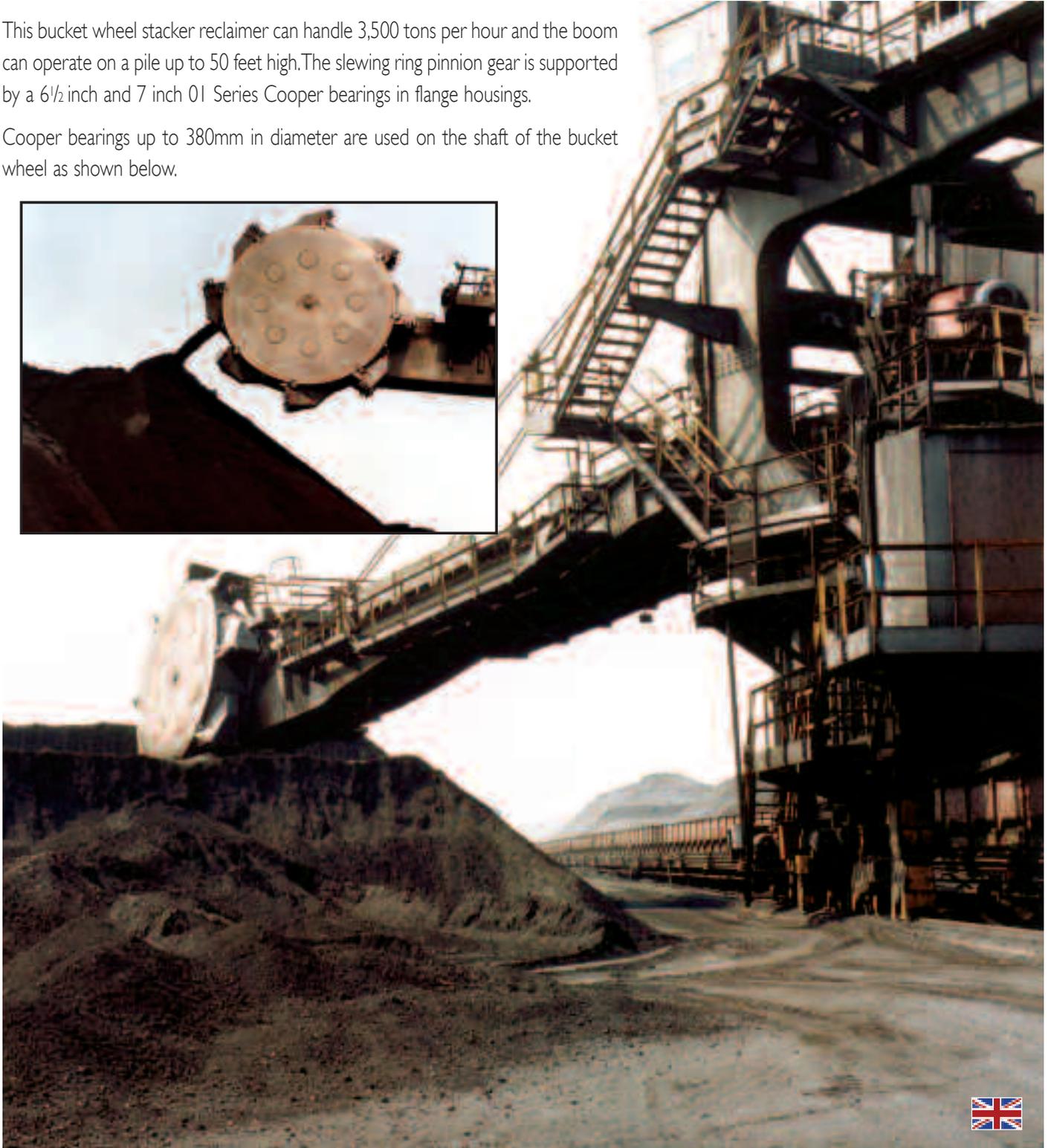
Cooper has considerable Water Turbine experience with applications in Canada, Italy, France and USA. Bearing specifications are from 01 BCPI80mm EX and GR on a horizontal turbine to four 01 BCF 380mm EX in special Flange housings on four turbines.



Stacker Reclaimer

This bucket wheel stacker reclaimer can handle 3,500 tons per hour and the boom can operate on a pile up to 50 feet high. The slewing ring pinion gear is supported by a 6½ inch and 7 inch 01 Series Cooper bearings in flange housings.

Cooper bearings up to 380mm in diameter are used on the shaft of the bucket wheel as shown below.



Mobile Shiploader

For operation in Saudi Arabia, this Mobile Shiploader is designed to receive Cement Clinker from 50 Ton dump trucks and discharge into vessels at a continuous handling rate of 1200 Tons per hour.

The Cooper BCF (Flange) bearing can be seen at the head of the retractable cascade chute.

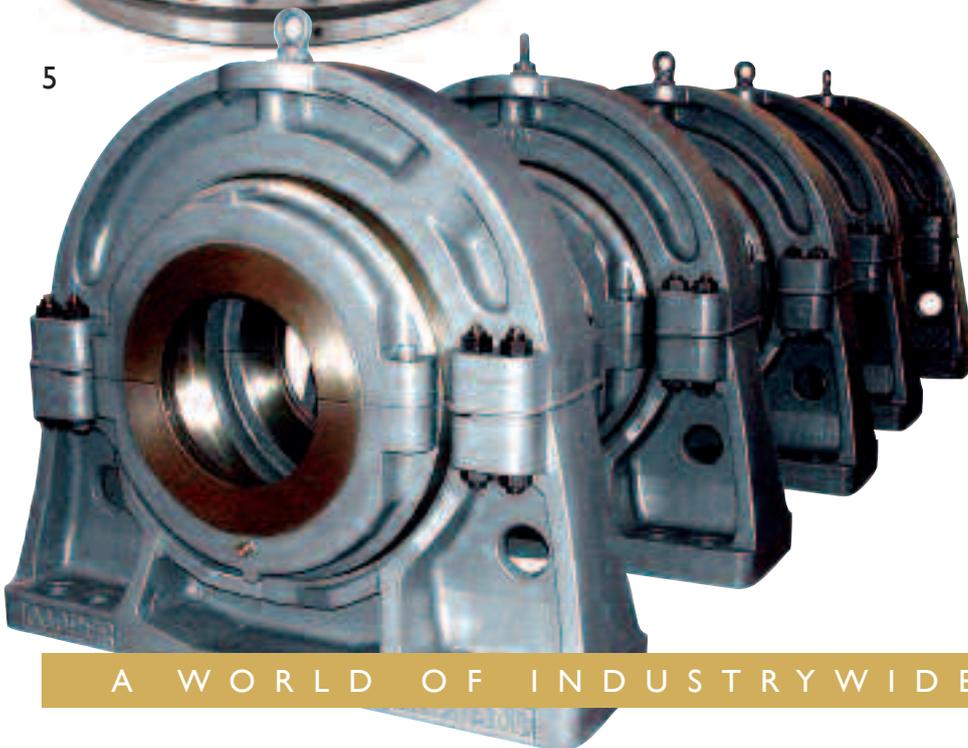


Made to Order Bearings

Typically 01 and 02 Series bearings over 300mm (12 inches) and all 03 and 04 Series are Made to Order. Cooper has the capability to manufacture split or solid thrust and radial roller bearings of any size up to 1.5m (60 inches) shaft diameter.

Key to Photographs

- 1 03 Series 300mm GR Pilger Mill Bearing.
- 2 Flat Thrust Roller Bearing.
- 3 110mm Solid Eccentric Bearing for use on Vibrating Screens in the Quarry Industry.
- 4 01 Series 850mm EXILOG Split Roller Bearing for use on Ball Mill Trunnions.
- 5 02 BCP 460mm Bearings for Marine Propulsion Shafts.
- 6 1000mm Solid Bearing for Converter Gearbox in US Steel Industry.



COOPER NOMENCLATURE

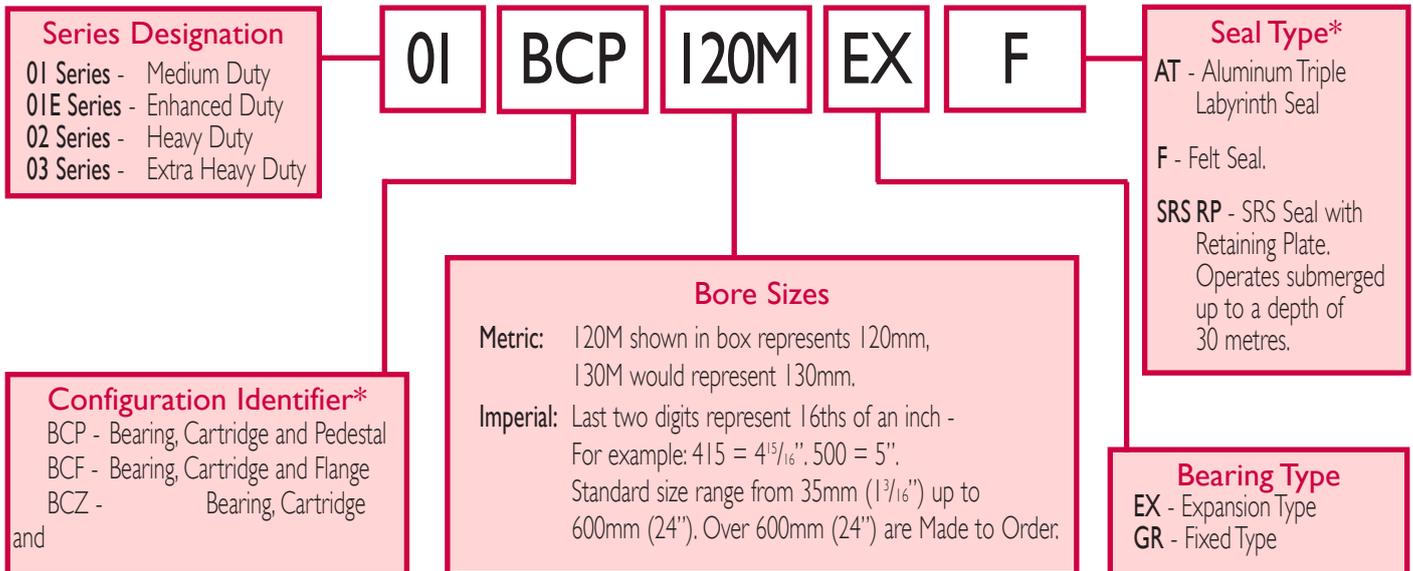
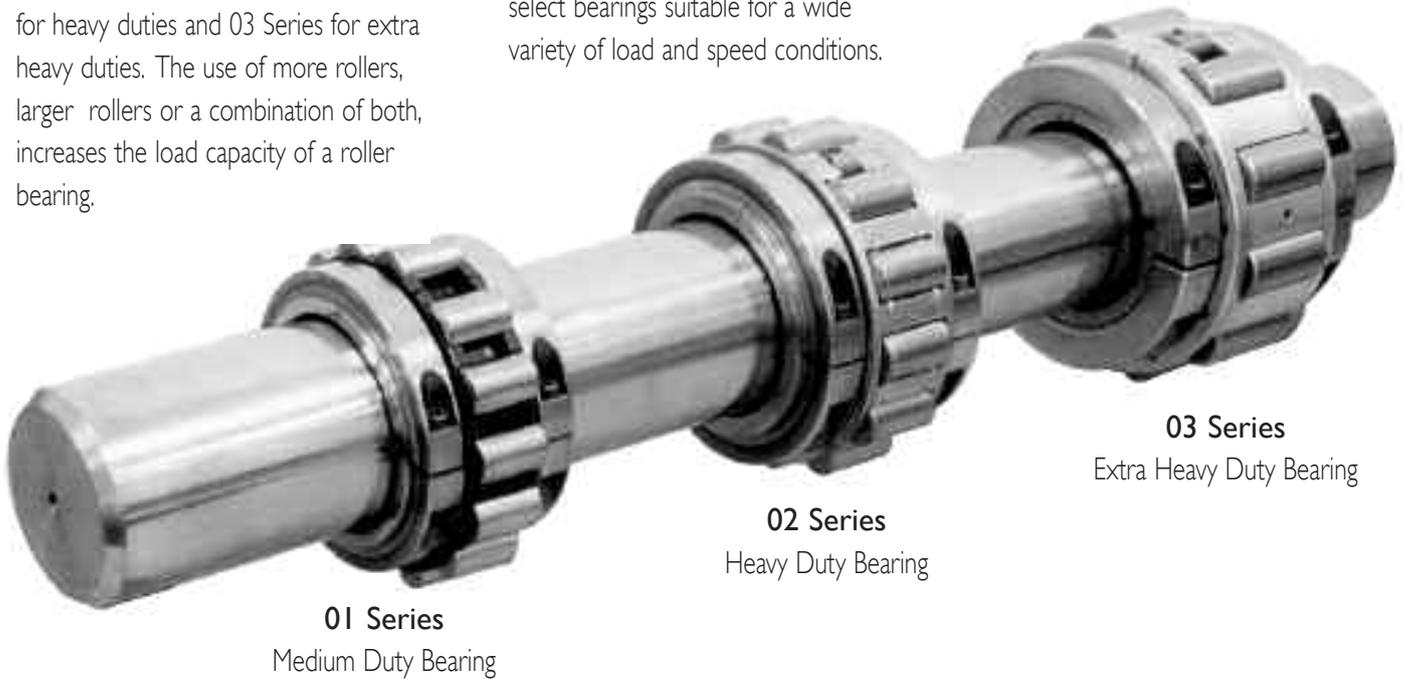
Comparison of Series

For most shaft sizes Cooper offers a range of three standard Series:

01 Series for medium duties, 02 Series for heavy duties and 03 Series for extra heavy duties. The use of more rollers, larger rollers or a combination of both, increases the load capacity of a roller bearing.

For a given shaft size, 02 Series offers more radial and axial capacity than the 01 Series. The 03 Series in turn offers more capacity than the 02. The choice of three Series enables Cooper users to select bearings suitable for a wide variety of load and speed conditions.

For more information please see the Cooper Split Roller Bearing Product Catalogue or visit our website at CooperBearings.com.



*The full range of Cooper Mounting and Sealing Options are shown in our Product Catalogue and on our Website: CooperBearings.com

A WORLD OF INDUSTRYWIDE EXPERIENCE



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