







Split Roller Bearing Applications

IN DUSTRY MATRIX

Applications	Building Maximilis	Balk Terninals	Centent and Aggragata	Food and Beverage	Forest Products	Gran	iron ard Stadi	Marine	Mining and Processing	Power Generation	Alip and Papar	Refining and Petrochom	Sagar	Water Treatment
Mechanical Handling														
Continuous Slab Casting Machines							Page 7	-						
Conveyors		2	Pages 4/5					Page 31	Pages 8/10		Page 20			
Cooling Beds		1	1.00			211	Page 24			-				1
Elevators	Page 27		Page 8			Page 15						1		
Line Shafts		1.00		-		2.25	1.1							
Log Decks and Tables						15.0		-						
Overhead Cranes		12			P									
Screw Conveyor			Pages 4/5			Page 14				12.5				01
Stacker Reclaimers		1					Page 30		1	- N				
Winding Gear														
Winders									Page 17					
Haulage Gear and Winches								1.00	Pages 17/26	-				
Process Equipment														
Ball Mill Trunnions		1	Pages 2/3/32						Pages 2/3					
Balt Mill Drives			Pages 2/3						Pages 2/3					
Cane Knives and Beet Slicers		-	1										Page 25	
Carriers and Feeders										100			Page 25	
Crushers		1	Page 4						1.0		1			1
Drum Processor Trunnions												1		1.00
Dryer Rolls										0.11		1.00	1	C 1
Kiln and Mill Under Rollers			Page 4						-	1.11	1	1		
Kiln and Tube Mill Drives									-					
Mill Drives								1		Page 16		$(1,\ldots,n)$	Page 26	
Mixers and Agitators						Page 14	-	-		21/11	Page 20			
Press Rolls		1.		-	C 1	100						1.00		
Reciprocating Screens			Page 21/32						Page 21					100
Rotating Drums				·							_	1.11		
Shredders											Page 20	1		
Sugar Diffuser Drives												1		
Sugar Diffuser Under Rollers												-		
Washers					1					0.1		1		
Ancillary Equipment														
Grankshafts										14				
Fans and Blowers			Pages 12/13	-				-		Page 22	Page 12			
Gearboxes						Page 15	Page 32							
Heat Exchangers			6. 12											
Motors and Generator Sets							Page 24/32			Page 23		-		
Pumps and Pump Drives								1		¥	-			-
Other Applications														
Hydro Turbines										Page 29				
Marine Propulsion Shafts								Pages 18/19	1					
Water Screens								1	1					Page 28
Wind Turbines										1.00				

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

C O O P E R



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 been 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.



A P P L I C A T I O N 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









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.









optimum performance.



effectivley in hostile and abrasive

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

External alignment ensure 360° concentricity at all times, eliminating

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



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

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





A WORLD OF INDUSTRYWIDE EXPERIENCE





Pictures 1 and 2

This German Bucket Elevator uses Cooper 01 BCP 160mm GR in trapped positions. The advatnages 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 exisiting 150mm bearing was replaced with a Cooper 01 BCP 150mm GR SRS. The split rubber seal was specified to combat the moist environmental conditions.







A WORLD OF INDUSTRYWIDE EXPERIENCE





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.



WORLD OF INDUSTRYWIDE EXPERIENCE Α









ONVEYOR BEARINGS С



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

WORLD OF INDUSTRYWIDE EXPERIENCE



C O N V E Y O R



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.



WORLD OF INDUSTRYWIDE EXPERIENCE Α





F A N S A N D BLOWERS

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 WORLD OF INDUSTRYWIDE EXPERIENCE





A WORLD OF INDUSTRYWIDE EXPERIENCE







HANDLING R A 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.

> OF INDUSTRYWIDE EXPERIENCE WORLD Α



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.

G

R A I N

maintenance expense, Cooper recommended 01 EBCDFN 75mm EX (Expansion) and GR (Fixed) bearings.



A WORLD



Photographs with permission of W L Duffield and Sons Limited





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.







INDUSTRYWIDE EXPERIENCE WORLD OF



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

bearing supplied for a tower mounted winder in a copper mine. Normal operating load is 185 tonnes and the speed is 54 rpm.





WORLD А



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







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.







A







WORLD OF INDUSTRYWIDE EXPERIENCE



A P E R A N D TIMBER Ρ

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 repacement 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.



A WORLD OF INDUSTRYWIDE EXPERIENCE





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.











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





The continually damp and sometimes very wet environment required the specification of ATL seals to prevent water penetrating the 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 mechansim for a Cooling Bed features 01 Series 170mm BCP Cooper bearings.





WORLD OF INDUSTRYWIDE EXPERIENCE



A W O R L D







Ν U S TRY D

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.

OF INDUSTRYWIDE EXPERIENCE







WORLD OF INDUSTRYWIDE EXPERIENCE A



Trapped Positions

Many photographs throughout this publication illustrate trapped bearing

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

Ashphalt Plant

'Self Lube' (shown lower right) to a Split to

The customer required a maximum



WORLD OF A

26



COOPER[®]

W A T E R REATMENT Т

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 27/16" 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 121/2" 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.





INDUSTRYWIDE EXPERIENCE A WORLD OF



28





29

POWER

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 BCP180mm EX and GR on a horizontal turbine to four 01 BCF 380mm EX in special Flange housings on four turbines.

A WORLD OF INDUSTRYWIDE EXPERIENCE

COOPER[®]

MISCELLANEOUS APPLICATIONS

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 pinnion gear is supported by a 61/2 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.





WORLD OF INDUSTRYWIDE EXPERIENCE



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.

be seen at the head of the retractible cascade chute.



A



WORLD OF INDUSTRYWIDE EXPERIENCE



UNIQUE SOLUTION PRODUCTS

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.

2

- 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.









C O O P E R N O M E N C L A T U R E

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.



01 Series Medium Duty Bearing

Series Designation 01 Series - Medium Duty 01E Series - Enhanced Duty		01		BC	CP	120	
02 Series - Heavy Duty 03 Series - Extra Heavy Duty							
Configuration Identif BCP - Bearing, Cartridge and F BCF - Bearing, Cartridge and F BCZ - Bearing, Cart and		M	etric: nperial:	120M shi 130M wo Last two For exam Standard 600mm i	Bon own in bo ould repre- digits rep ople: 415 size rang (24"). Ove		

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



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



02 Series Heavy Duty Bearing



INDUSTRYWIDE EXPERIENCE





Cooper Customer Service Centres

UK, Africa, Asia, Australasia and the Middle East

Cooper Roller Bearings Co Ltd Wisbech Road King's Lynn Norfolk PE30 5JX England Telephone +44 (0) 1553 763 447 Fax +44 (0) 1553 761 113

USA and Mexico

The Cooper Split Roller Bearing Corp. 5365 Robin Hood Road, Suite B Norfolk, VA 23513 USA Telephone 757 460 0925 Fax 757 464 3067

Europe and South America

Cooper Geteilte Rollenlager GmbH Postfach 100 423 Oberbenrader Str 407 47704 Krefeld Germany Telephone +(49) 2151 713 016 Fax +(49) 2151 713 010

Canada

Cooper-Grainger Canada Inc. 5875 Coopers Avenue Mississauga Ontario L4Z 1R9 Canada Telephone 905 890 2266 Fax 905 890 2269

Locate Your Nearest Distributor by Visiting CooperBearings.com



Issue May 2005

R u d U K 1 K v 2