

TIMKEN

铁姆肯公司轴承应用 火电行业

2012年铁姆肯公司中国授权经销商培训大会
2012 Timken China Authorized Distributor Training Conference

2012年8月
August , 2012



内容 Agenda

- 铁姆肯公司的产品线
- 电力行业应用经验
- 铁姆肯公司的资源
- 轴承应用介绍
- 问题与答案
- Timken product line
- Timken experience in power plant
- Timken's resource
- Bearing application introduce
- Questions and answers

铁姆肯公司的产品线 Timken Product Line

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始终致力于技术的不断进步 Commitment to Technical Progress

- | 每年在研发上投入**5**千万美金的巨额资金
 - | 在工程分析工具上保持领先的地位
 - | 致力于新产品的开发和服务
 - | 更多的摩擦管理解决方案
-
- | **\$50 million annual investment in research and development**
 - | **Leadership position in engineering analysis tools**
 - | **Dedication to new products and services**
 - | **Friction Management solutions**



电力行业应用的经验

Power Generation Experience

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- | 在北美与配套客户合作的领先地位
- | 几十年的丰富经验
- | 深刻理解客户需求
- | 专注的技术支援
- | 不断开发解决方案的历史传统
- | **North American design leadership**
- | **Decades of experience**
- | **Understand customer needs**
- | **Dedicated engineering resources**
- | **A history of finding solutions**



电力行业应用的经验

Power Generation Experience

“当我考虑联盟合作伙伴的时候，铁姆肯公司是我的首选。他们不仅帮助我们持续稳定的提供产品，还向我们的设备维护人员提供现场的培训，使我们的设备发挥最大的功效。如果我们的轴承有问题，他们立刻就能解决。”

迈克尔 米其
设备维护主管
太平洋公司

“Timken comes to the forefront when I think about alliance partners. They help us keep a steady supply of products and have provided hands-on training to our maintenance people to help maximize performance. If we ever have a bearing problem, they get right to it.”

Michael Mackey
Maintenance Planner
Pacific Corporation

电力行业应用的经验

Power Generation Experience

“铁姆肯公司轴承的可靠性对于我们电厂的持续稳定运转至关重要。铁姆肯公司已经向我们证实他们的可靠性。对于我们的大部分轴承的需求，我们将继续选择铁姆肯公司的轴承。”

唐尼 菲利普斯

物料管理

Indianapolis P&L Co.

“The dependability and reliability of Timken bearings is essential to keeping our plant operating efficiently. Timken has proven that they are a supplier we can rely on. We will continue to depend on Timken for all of our major bearing needs.”

Donnie Phillips

Materials Management

Indianapolis P&L Co.

铁姆肯公司的资源 Timken Resources

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| 销售工程师

| 应用工程师

| 服务工程师

| **Sales engineers**

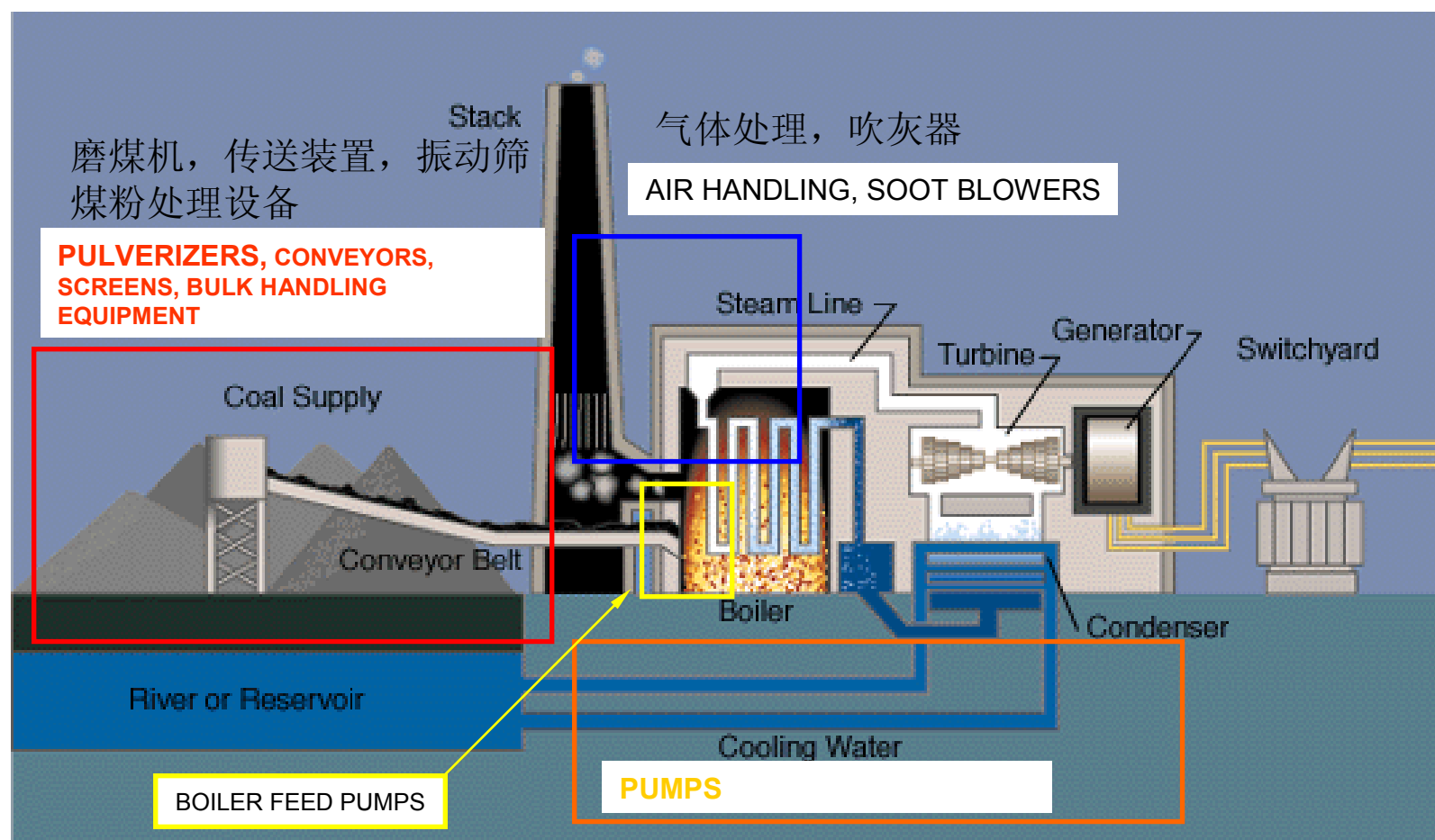
| **Application engineers**

| **Service engineers**



电力行业应用的细节

Power Generation Application Detail



锅炉加料泵

火力电厂的轴承应用机会

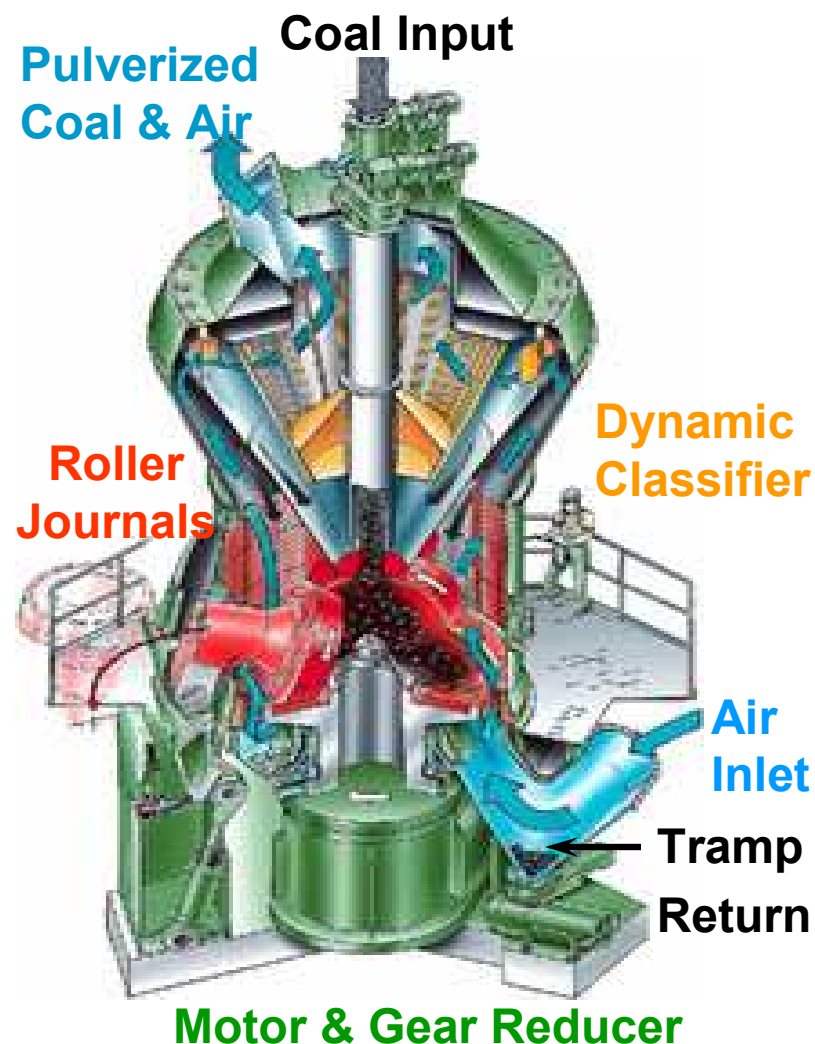
Coal-Fired Power Plant Bearing Opportunities

	球轴承 BB	圆柱滚子轴承 CRB	调心滚子轴承 SRB	圆锥滚子轴承 TRB	带座轴承 HU
立磨 Pulverizers		X	X	X	
齿轮箱 Gearboxes		X	X	X	
空气预热器 Air Preheaters			X		
其他的动力传动设备 Miscellaneous PT	X	X	X	X	X
初级破碎 Primary Crushing		X	X	X	
分筛器 Classifiers	X	X			
物料传送设备 Material Handling	X		X	X	X
泵 Pumps	X	X	X	X	X
吹灰机 Soot Blowers	X				

磨煤机应用知识

Pulverizers Bowl Mills

- 煤从磨煤机顶端入口落入磨盘中央
Coal is fed into the inlet at the top of the pulverizer and falls to rotating grinding table
- 磨辊的预压力通过液压或弹簧装置实现
Pulverizer wheel journals are hydraulically or spring loaded against table
- 热风从磨盘底部吹入，把煤粉吹到顶部
旋转筛选器的进口风环
Forced hot air enters below table and carries particles up to rotating classifier inlet vanes



磨煤机应用知识

Pulverizers Bowl Mills

- 适当大小的细煤颗粒可以通过筛选器并被送到锅炉燃烧

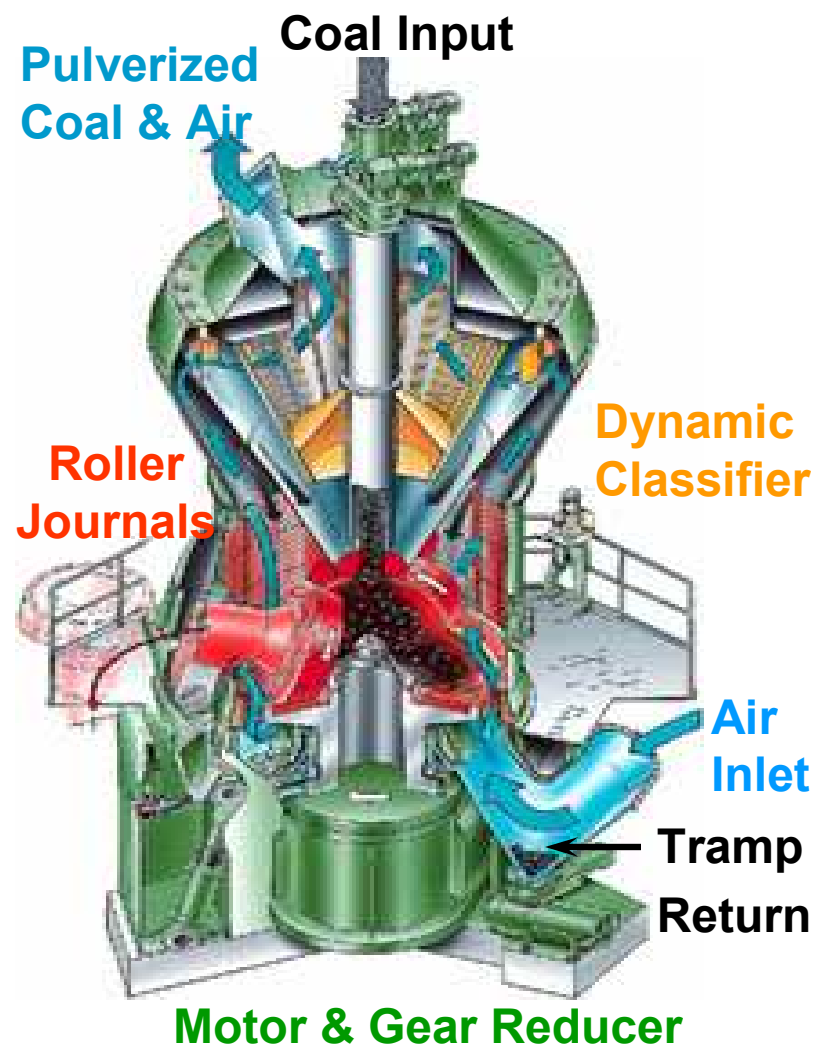
Properly-sized fine coal particles pass through classifier vanes and travel to boiler

- 大颗粒返回磨盘进一步研磨

Larger particles return to grinding table for further pulverization

- 难磨的杂物从排渣口排出

Tramp (foreign material) is carried off in reject hopper



磨煤机的主要制造商

Pulverizers

Bowl Mills - Global Manufacturers

North America	<ul style="list-style-type: none"> Alstom Power (Combustion Engineering / ABB) Babcock & Wilcox Foster Wheeler Babcock Borsig Power (Riley) 	
Europe	<ul style="list-style-type: none"> Ansaldo Hitachi – Babcock Mitsui Babcock 	Italy Germany UK
Asia	<ul style="list-style-type: none"> 北京电力设备总厂 Beijing Power Equipment Group 上海重型机械厂 Shanghai Heavy Machinery Plant 长春发电设备有限公司 Changchun Generating Equipment Co, Ltd 巴拉特重型电气有限公司 Bharat Heavy Electricals (BHEL) PT Energy Systems 台塑重工 Formosa Heavy Industries 斗山重工 Doosan Heavy 	China China China India Indonesia Taiwan Korea

磨煤机的设计类型

Pulverizers

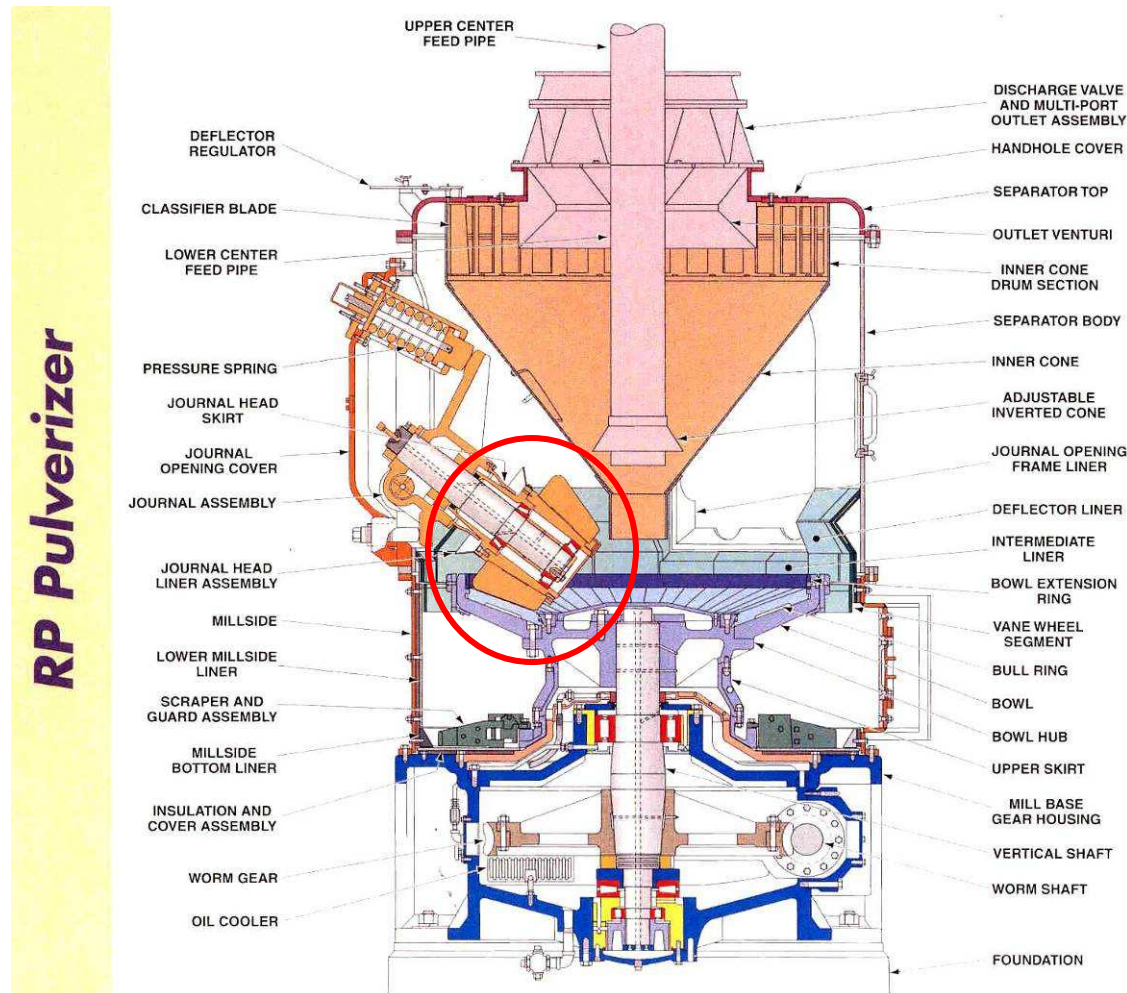
Bowl Mills - Design Configurations

OEM	磨辊轴承类型 Journal Bearing Type	授权商 Licensees
Alstom Power	圆锥/圆锥 TRB / TRB	<ul style="list-style-type: none">■ 上重 SHMP■ 巴拉特重型电气 BHEL■ 斗山重工 Doosan Heavy
Babcock & Wilcox	圆柱/调心 CRB / SRB	
Foster Wheeler	圆柱/调心 CRB / SRB	<ul style="list-style-type: none">■ 台塑重工 Formosa Heavy
Babcock Borsig Power	圆柱/调心 CRB / SRB	<ul style="list-style-type: none">■ 北京发电厂 Beijing Power

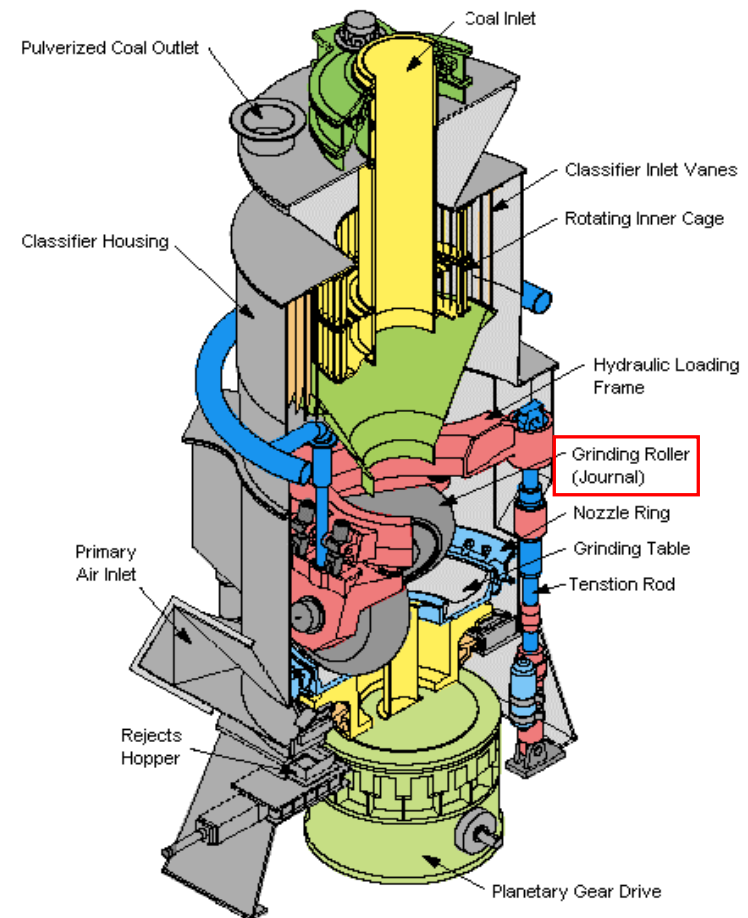
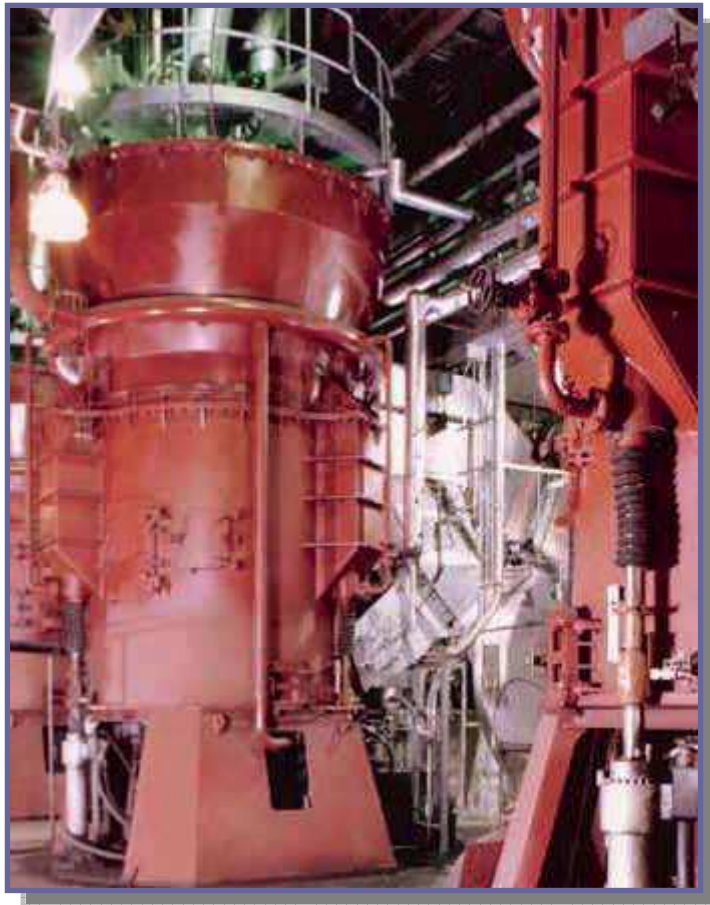
磨煤机设计 Bowl Mill Design

Alstom Power (CE/ABB), SHMP, BHEL, Doosan

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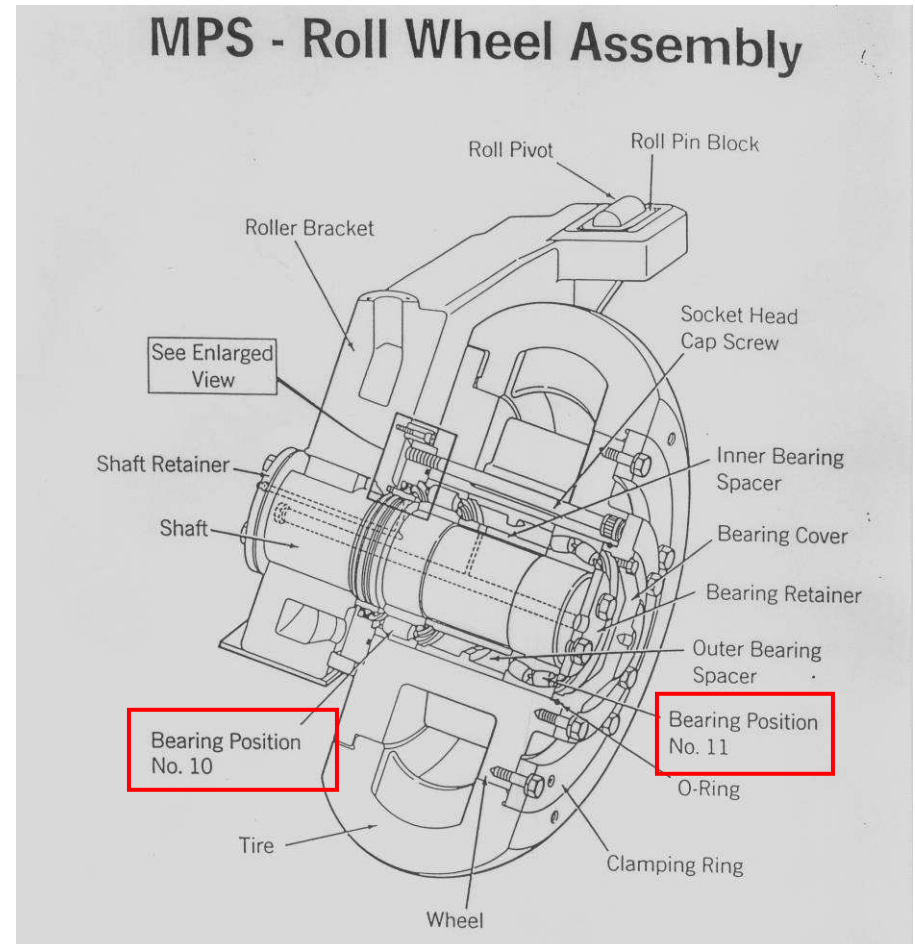
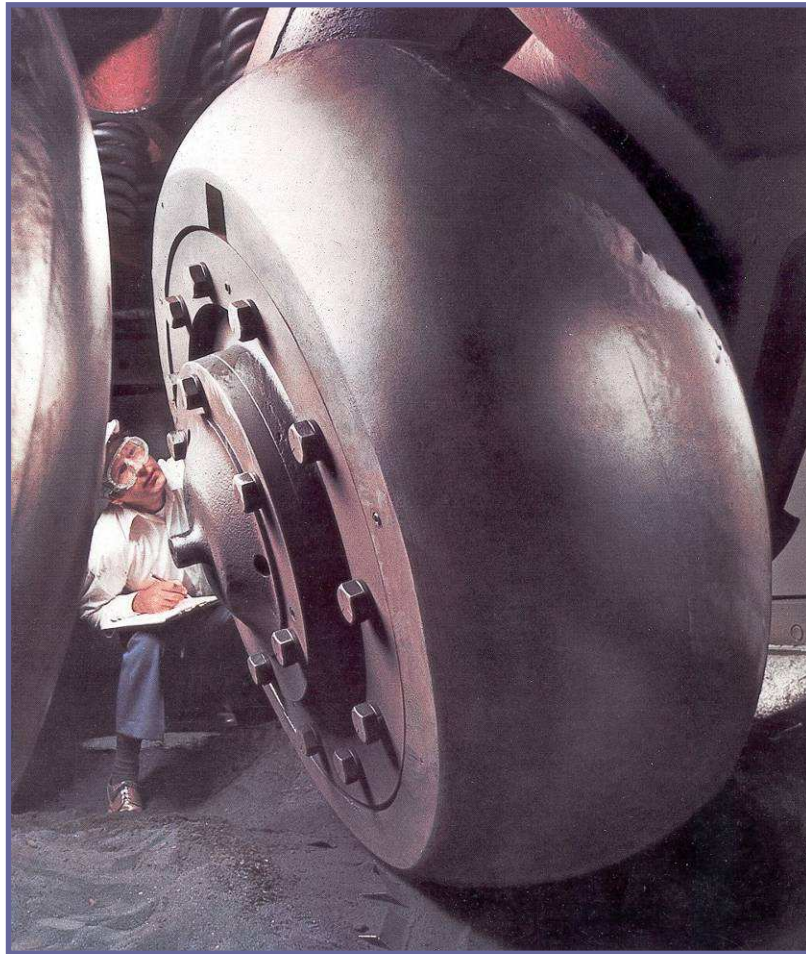


磨煤机设计 Bowl Mill Design Babcock & Wilcox MPS89



磨煤机设计 Bowl Mill Design Babcock & Wilcox MPS89

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磨煤机设计 Bowl Mill Design

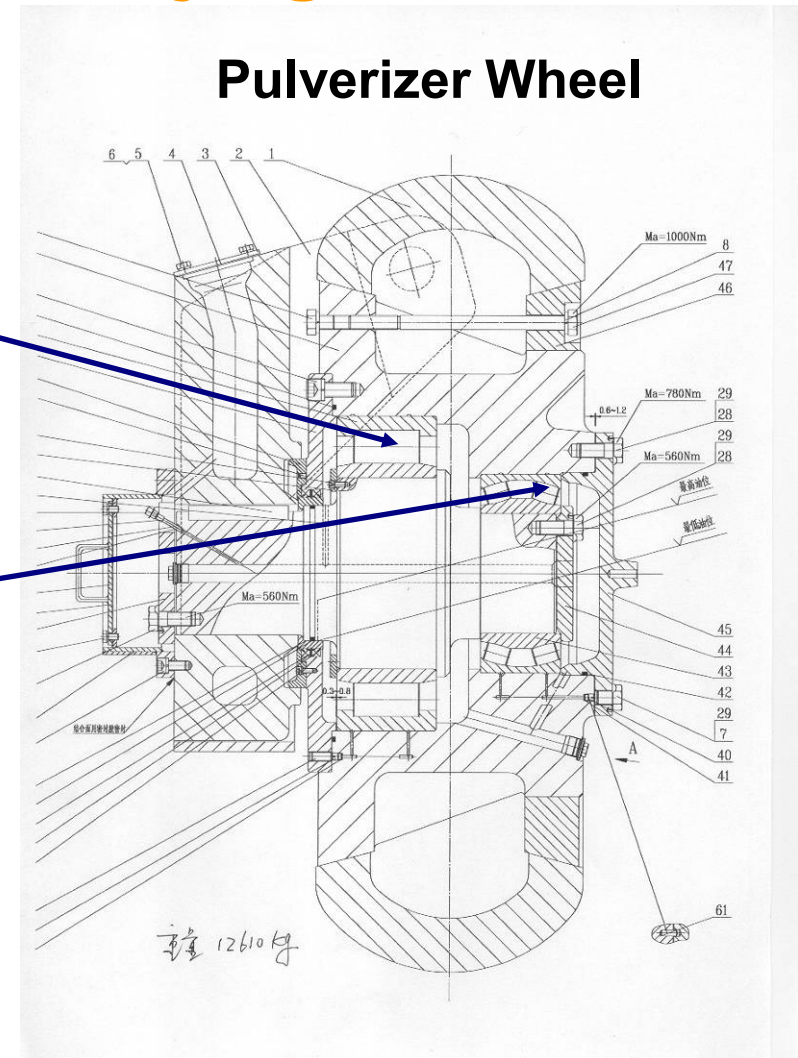
Babcock Borsig Power, Beijing Power

圆柱滚子轴承 CRB

- NU type
- Series 23, 31
- 公差配合 Fitting Practice
 - 轴 Shaft: 过渡配合Transition, J5
 - 轴承座 Housing: 紧配合tight, N6 to P6

调心滚子轴承 SRB

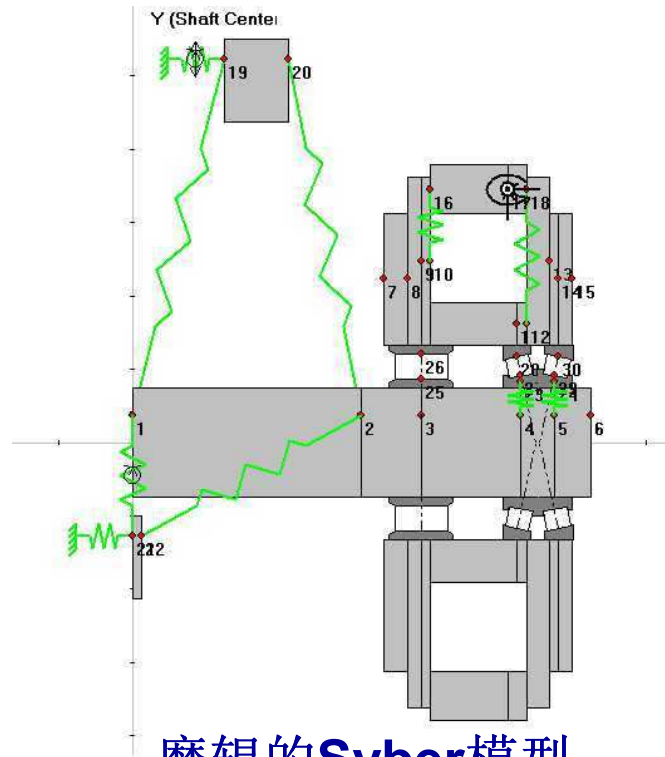
- YM (or CA) type
- 公差配合 Fitting Practice
 - 轴 Shaft: 过度配合Transition, G5
 - 轴承座 Housing: 紧配合tight, N6 to P6



磨煤机设计 Bowl Mill Design

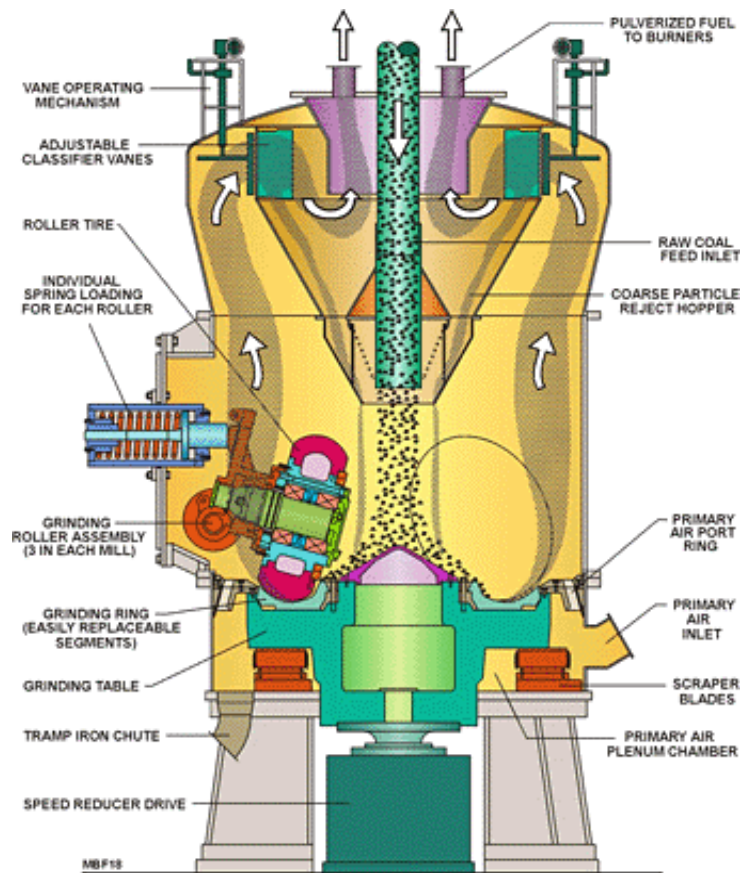
Foster Wheeler, Formosa Heavy Industries

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磨辊的Syber模型

Syber Model of Pulverizer Wheel



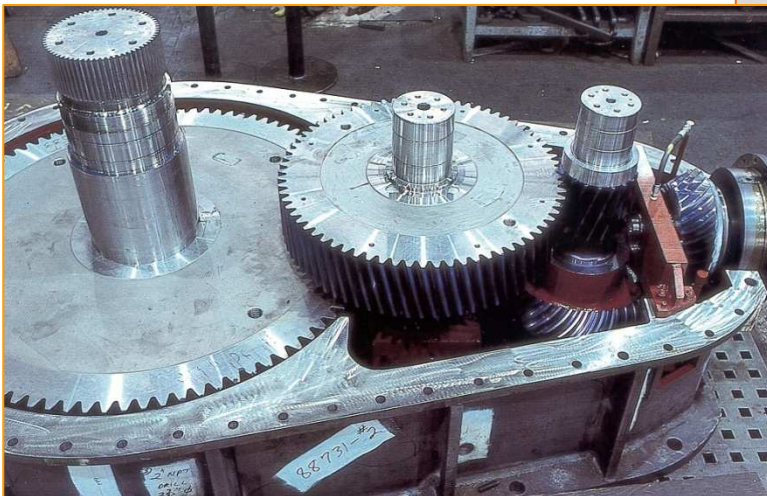
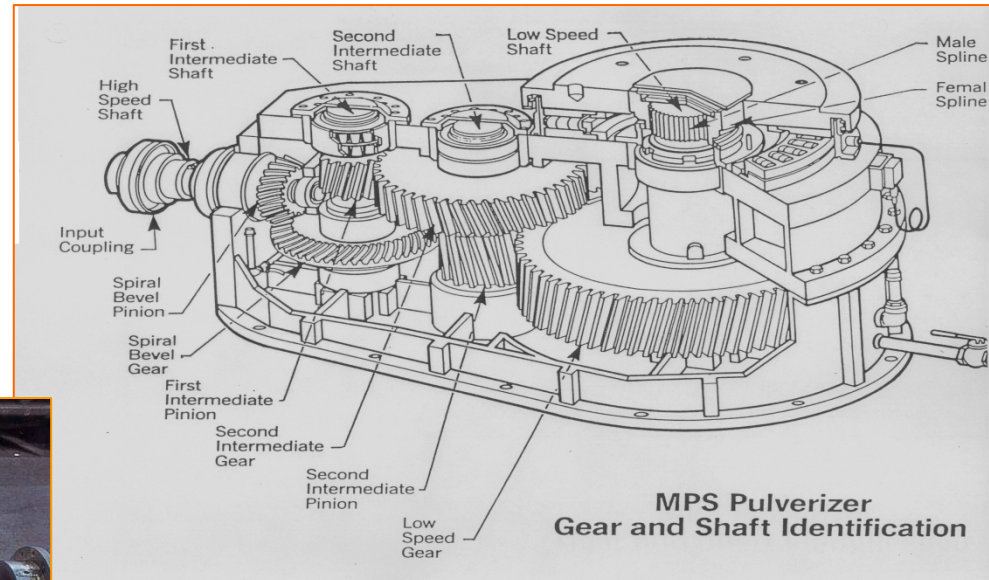
Foster Wheeler MBF Coal Pulverizer

磨煤机损坏模式：磨辊剥落 Pulverizer Damage Modes Roll Wheel Spalling

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磨煤机齿轮箱 Pulverizer Gearboxes

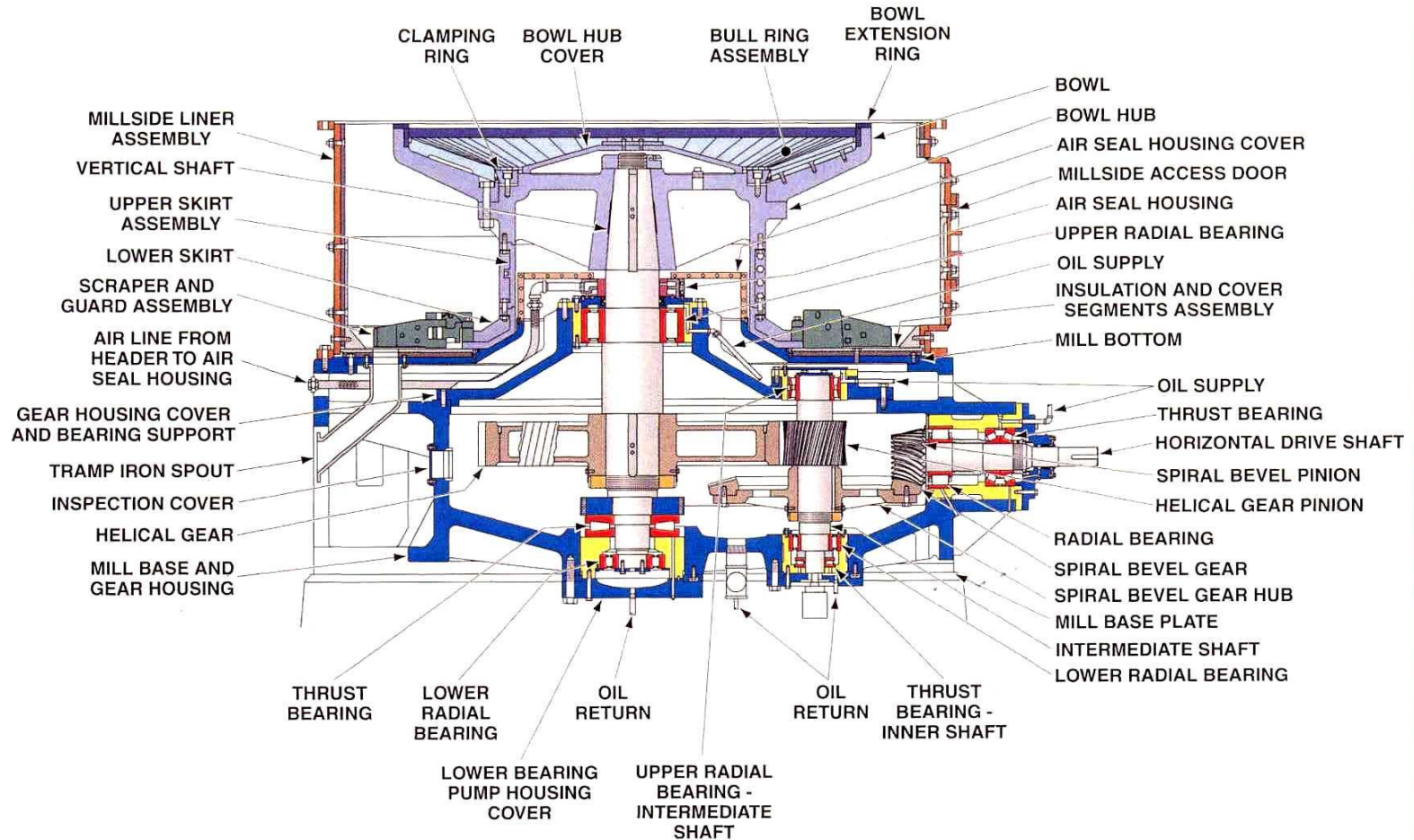


B&W MPS 三级减速齿轮箱

B&W MPS 三级减速齿轮箱

磨煤机齿轮箱 Pulverizer Gearboxes

Double Reduction Gearbox

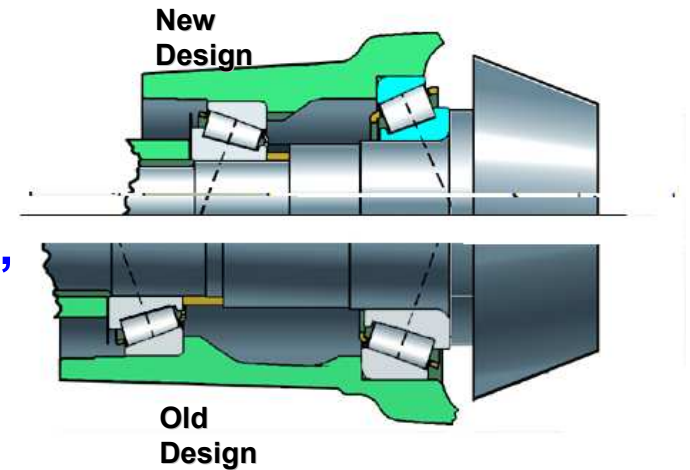


铁姆肯在齿轮箱应用的经验

Timken Gearbox Experience

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- 为各种磨煤机的轴承选型，包括**B&W** 和 阿尔斯通(**CE**)各型齿轮箱的轴承
- 与全球不同的齿轮箱设计及制造公司有广泛的联系
- 我们的经验可帮助客户的机械设计更为“功率密集”
 - 在更小的空间承受相同载荷
 - 在相同的空间承受更高的载荷



- Selected bearings for pulverizers, including B&W MPS89 and Combustion Engineering gearboxes**
- Global relationships with gearbox designs and builders**
- Experience making designs “Power Dense”**
 - maintain loads in a smaller envelope**
 - higher loads in same envelope**

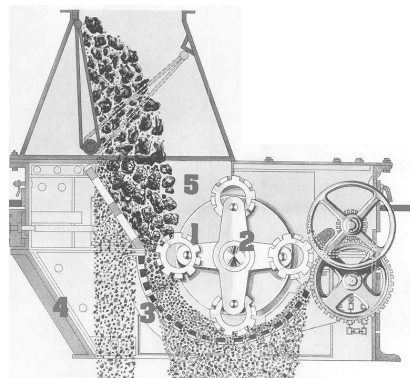
应用专家 Application Specialist

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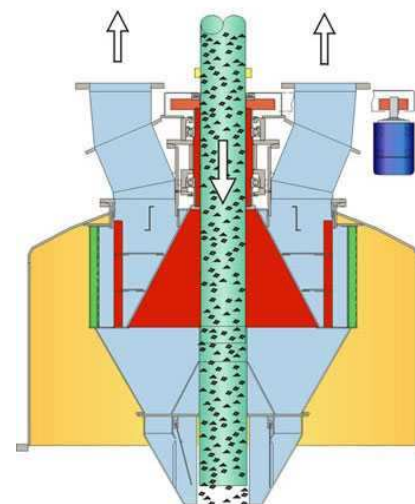
Conveyors

传送装置



Primary Crushing

初级粉碎



Dynamic Classifier

动态筛选器



Air Preheaters

空气预热器

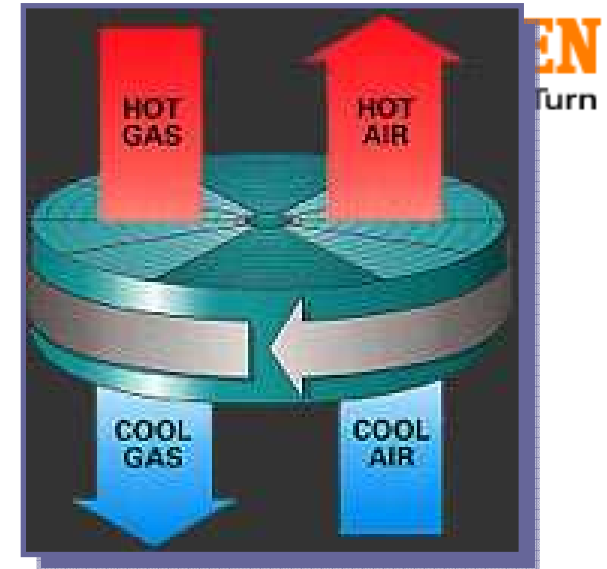


Pumps

泵

空气预热器 Air Preheaters

- 燃烧气体经预热以达到改善燃烧过程提高燃烧效率
 - 热量通过暖气管输送给燃烧气体
- 两种预热器类型
 - 可再生型:通过旋转板传热
 - 调心 + 止推调心 SRB + thrust SRB
 - 可恢复型
 - 通过固定的金属板在暖气管和燃烧气体之间直接传热
- Combustion air is preheated to improve combustion process and overall efficiency of unit
 - Heat from flue gas transferred to combustion air
- Two types of air preheaters
 - Regenerative: Heat transferred through rotating plates
 - Uses large SRB and SRB thrust bearings
 - Recuperative
 - Direct heat transfer between flue gas and combustion air via stationary metal plates



Internal rotor

Top – SRB (YMB)

Bottom – TSR (EJ /EM)



Rotary Regenerative Preheater

辅助设备

- 鼓风机&工业风扇
- 斗式提升机&堆取料机
- 传送带

鼓风机&工业风扇

转子轴承:

- SRB+SRB调心轴承
- CRB+CRB+FCBB

圆柱轴承+圆柱轴承+四点接
触球轴承



斗式提升机&堆取料机



轴承:

- SRB调心滚子轴承



物料输送



特殊设计 Specialized Solutions

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用于吹灰器的球轴承
**Ball Bearings
for Soot Blowers**



抗杂质轴承
**Debris Resistant
Bearings**



DuraSpexx 高功率系列
**DuraSpexx
Power Rating Series**



固体润滑轴承
Solid Lube Bearings

用于吹灰器的球轴承 Ball Bearings for Soot Blowers

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- | 专门为美国Diamond Power公司I/R型吹灰器开发的轴承
 - | 高温密封和增加径向间隙以便更好的运转
 - | 高温脂允许轴承在高温条件下运作
 - | 与标准轴承相比，寿命可提高2-4倍
-
- | Interchange for Diamond Power I/R soot blowers
 - | high-temperature seals and expanded radial-internal clearance for easier turning
 - | high-temperature grease allows bearing to adjust to heat increases
 - | extended bearing life 2-4 times from standard ball bearings

DuraSpexx 高额定载荷的产品系列

DuraSpexx Power Rating Series

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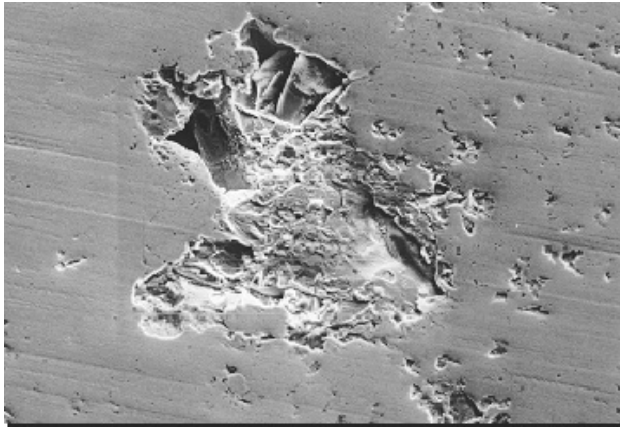


- | 1986年以来，铁姆肯第一次提高轴承的额定负载
- | 增加23%的额定载荷/增加一倍的寿命
- | 针对疲劳损伤模式提高轴承性能
- | 以加强材料，优化型面和表面处理技术为基础
- | 在不改变安装尺寸的情况下使系统升级

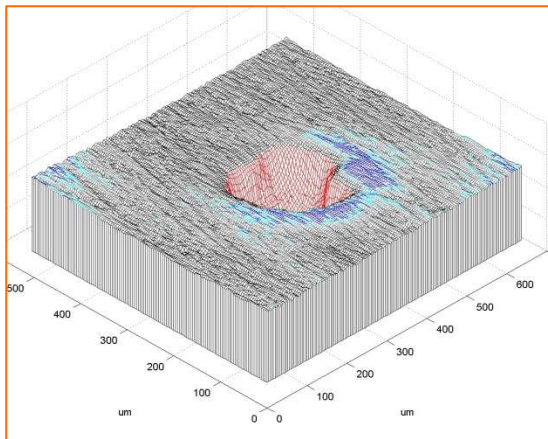
- | First Timken ratings increase since 1986
- | Offers 23% ratings increase/2X life
- | Addresses bearing performance when damage mode is fatigue life
- | Performance based on combination of enhanced material, profiles and finishes
- | Allows system upgrade without changing envelope dimensions

抗磨粒轴承 Debris Resistant Bearings

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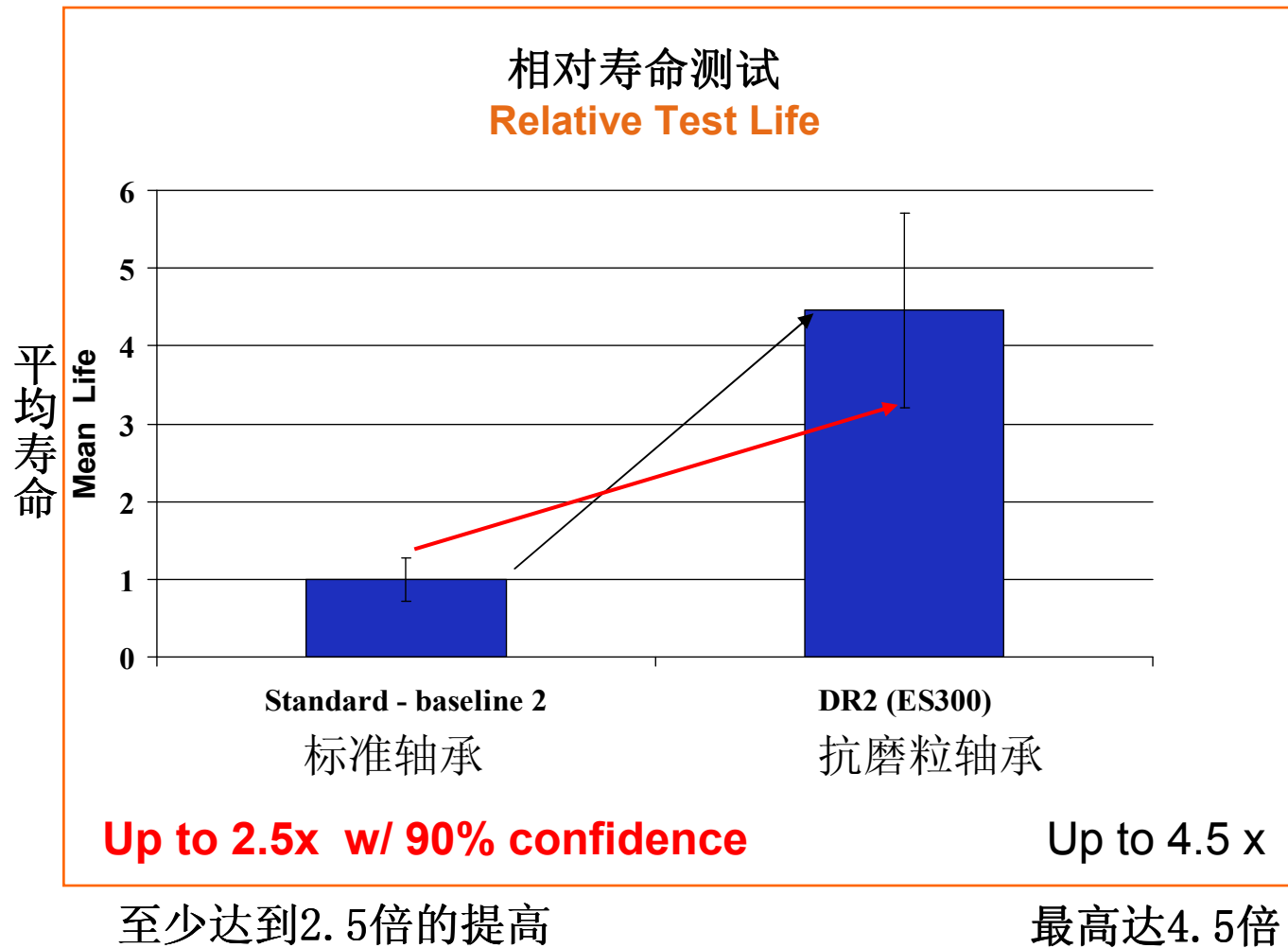


- | 标准的铁姆肯轴承就比竞争对手的抗磨粒轴承性能高
- | 抗磨粒轴承是热处理和增强的表面处理技术的结晶
- | 先进的保护层，以抵抗磨粒
- | 也可以针对临界润滑和假性压痕等损坏模式起到一定保护效果



- | A standard Timken bearings outperform competitors debris resistant product
- | DR product is combination of heat treat processes and enhanced surface finishes
- | An advanced layer of protection in environments where debris is a concern
- | Also potentially addresses damage modes from marginal lube and false brinelling

抗磨粒轴承 Debris Resistant Bearings



固体润滑轴承 Solid Lube Bearings

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- | 由聚合物，润滑油和其它添加剂合成
- | 可以应用到圆锥滚子轴承，圆柱滚子轴承和调心滚子轴承
- | 可以在人力和材料方面节约75%的成本
- | 美国德州电力公司(Texas Utility)的使用经验固体润滑轴承产品可以达到8年的寿命
- | Created from polymers, oils and other additives
- | Can be incorporated into TRBs, CRBs and SRBs
- | Some customers have reported a 75% reduction in labor and material costs
- | TXU claimed bearing life was 8 years with solid lube product

服务一览表 Services Portfolio

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状态监测
**Condition
Monitoring**



维修服务
**Repair
Services**



润滑解决方案
**Lubrication
Solutions**



涂层/表面处理
**Coatings/
Finishes**

铁姆肯可以帮助你！ Timken Is Here to Help!

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- 几十年的经验
 - 应用知识
 - 分析工具
 - 损伤分析
 - 培训
 - 广泛的解决方案
 - 电力行业的合作伙伴
- Decades of experience
 - Application knowledge
 - Analysis tools
 - Damage Analysis
 - Training
 - A broad range of solutions
 - A partner in Power Generation

Questions???

- 问题1：在发电行业铁姆肯公司轴承主要用在哪两种设备上？
- Question 1: What equipments are Timken bearings mainly used for in Power Generation industry?

Answer

- 磨煤机 Coal Pulverizer
- 空气预热器 Air Preheater

- 问题2:磨煤机的磨辊上一般用哪些类型轴承?
- Question 2 :What types of bearing are usually used in coal Pulverizer grinding roller?

Answer:

- **TRB+TRB**
- **SRB+CRB**

- 问题3：磨煤机磨辊工作环境有哪些特点？
- Question 3: What is the features of working environment for grinding roller bearing?

Answer

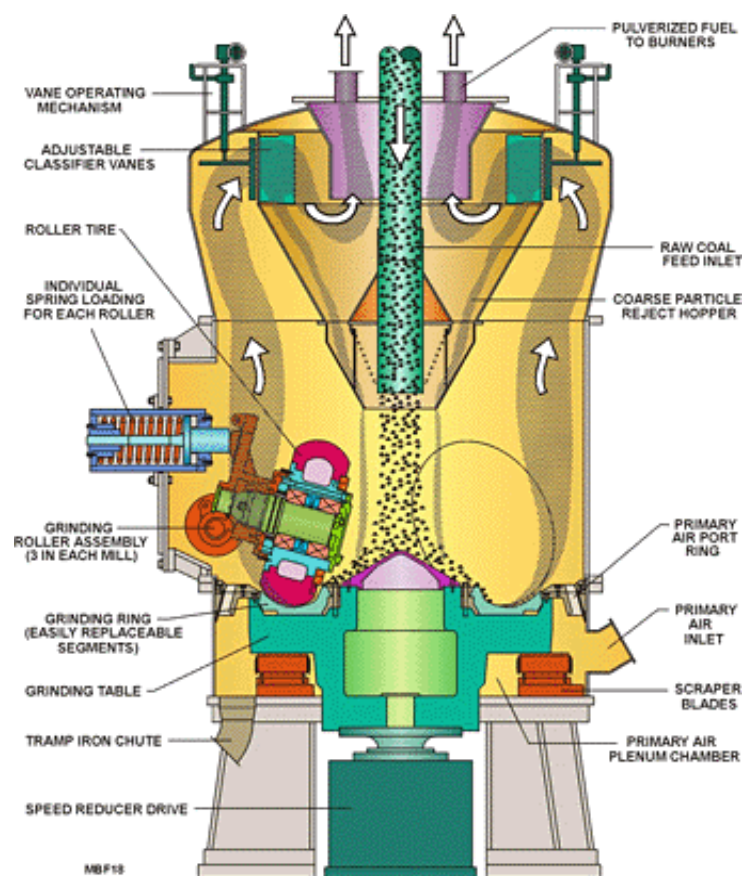
- Heavy load、Impact load 重载、冲击载荷
- Low speed 低速
- Debris environment 杂质污染
- Possible low lubricating situation 润滑不够

- 问题4：在火电行业，Timken公司提供哪些比较特殊的解决方案？
- Question 4: what kinds of special solutions Timken provide for Power generation industry?

Answer

- 用于吹灰器的球轴承
 - DuraSpexx系列轴承
 - 抗磨粒轴承
 - 固体润滑轴承
-
- Ball bearing for Sootblower
 - DuraSpexx Power Rating Series
 - Debris Resistant Bearing
 - Solid Lube Bearing

- 问题5： 请解释磨煤机工作原理
- Question 5: Please explain how the pulverizer works.



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Thanks!

