

# TRM型水泥辊磨

## TRM SERIES CEMENT VERTICAL ROLLER MILL



### 主要技术优势

#### Main technical advantage

- 磨辊可以自行抬落，实现空载启动。
- 磨机操作简单，运行平稳，振动小。
- 水泥细度控制严格，调节灵敏。
- 设备运转率高，故障停机时间少。
- 磨辊可以靠油缸作用自动翻出机壳外，维修方便。
- 耐磨部件采用堆焊技术，维护方便。
- To be of automatic raise-up grinding roller for the no-load start-up;
- To be of simple operation, stable running and little vibration;
- To be of strict control of product fineness and flexible adjustment;
- To be of high availability and less defect stop;
- To be of automatic roller swing out system via hydraulic cylinder and easy for maintenance;
- To be of hardfacing of wear resistant part and easy for maintenance;

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## 1 概况

### Development of trm series cement vertical roller mill

TRM型水泥辊磨（简称“水泥辊磨”）是在TRM型原料辊磨基础上开发的专门用于水泥粉磨的新型设备。首台TRMK4541水泥辊磨于2010年6月在越南福山水泥有限公司投入使用，填补了同类技术装备国产化的空白。

TRM型水泥辊磨的开发经历了以下几个主要的阶段：

- 2007年，完成利用辊磨粉磨水泥的实验室试验。
- 2009年，完成台产60t/h水泥辊磨的工业化试验研究。
- 2009年，完成TRMK4541水泥辊磨的设计开发。
- 2010年，首台TRMK4541水泥辊磨在越南福山水泥有限公司投入运行。
- 2011年，“水泥立式辊磨终粉磨技术开发与应用”通过建材联合会组织的技术鉴定。
- 2011年，首台TRMK5041水泥辊磨在喀什天山水泥有限公司投入运行。
- 2012年，首台TRMK556.4水泥矿渣立磨完成设计开发并同潍坊特钢集团签订立磨合同，该立磨目前为国内最大的矿渣水泥立磨。

TRM series Cement Vertical Roller Mill is the specialized equipment for cement grinding based on TRM series Raw Vertical Roller Mill. The initial TRMK4541 Cement Vertical Roller Mill was operated in Vietnam Phuc Son Cement Co., Ltd in June of 2010.

The followings are the main steps of the development of TRM Series Cement Vertical Roller Mill.

- Year of 2007, to complete the lab test of cement vertical roller mill;
- Year of 2009, to complete the industrial experiment and research of cement vertical roller mill (60t/h);
- Year of 2009, to complete the engineering design and development of TRMK4541 Cement Vertical Roller Mill;
- Year of 2010, the initial TRMK4541 Cement Vertical Roller Mill was operated in Vietnam Phuc Son Cement Co., Ltd;
- Year of 2011, the subject of “Development and Application of using Cement Vertical Roller Mill as the Finish Grinding of Cement Industry” was passed the technical appraisal by China Building Material Association;
- Year of 2011, the initial TRMK5041 Cement Vertical Roller Mill was operated in Kashi Tianshan Cement Co., Ltd;
- Year of 2012, to complete engineering design and development of the initial TRMK556.4 Cement & Slag Vertical Roller Mill, and enter into supply contract with Weifang Special Steel-making Group. Such vertical roller mill is the biggest one for cement and slag grinding available in China.

## 2 TRM型水泥辊磨的特点

### Characteristics of trm series cement vertical roller mill

TRM型水泥辊磨在结构、使用、维护等方面的特点主要有以下几点：

- 研磨部分采用平-斜磨盘加锥形磨辊。
- 分选部分采用动静态结合的组合式高效笼型选粉机。
- 每个磨辊相对独立的对磨盘上物料的施压。
- 磨辊润滑为稀油循环方式。
- 磨辊轴承密封采用三道氟橡胶骨架油封。
- 风环面积和挡料圈高度可以根据情况调整。
- 磨辊可以自行抬落，实现空载启动。
- 磨机操作简单，运行平稳，振动小。
- 水泥细度控制严格，调节灵敏。
- 设备运转率高，故障停机时间少。
- 磨辊可以靠油缸作用自动翻出机壳外，维修方便。
- 耐磨部件采用堆焊技术，维护方便。

The followings are the main characteristics of TRM series Cement Vertical Roller Mill in aspect of structure, operation and maintenance.

- To be of horizontal and inclined grinding table integrating cone type grinding roller;
- To be of static and dynamic combined high efficiency cage type separator for mill internal classifying;
- To be of relative independently pressing to the material by each grinding roller;
- To be of oil lubrication system for grinding roller;
- To be of triple fluororubber framework oil seal for bearing of grinding roller;
- To be of adjustable gas ring area and dam ring height;
- To be of automatic raise-up grinding roller for the no-load start-up;
- To be of simple operation, stable running and little vibration;
- To be of strict control of product fineness and flexible adjustment;
- To be of high availability and less defect stop;
- To be of automatic roller swing out system via hydraulic cylinder and easy for maintenance;
- To be of hardfacing of wear resistant part and easy for maintenance;

### 3 TRM型水泥辊磨系统

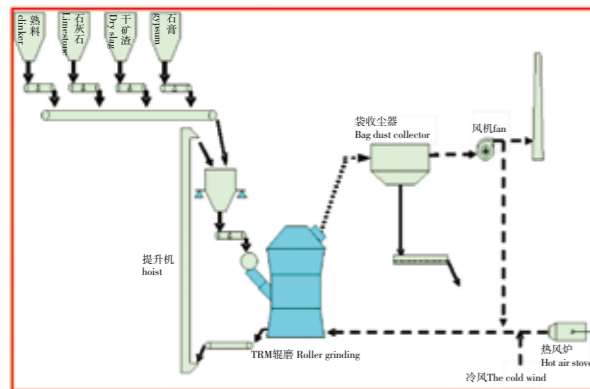
## Trm series cement vertical roller mill system

TRM型水泥辊磨系统的流程非常简单，属单风机的辊磨粉磨系统。混合料由喂料皮带经喂料锁风阀喂入辊磨，在辊磨中物料随着磨盘的旋转从其中心向边缘运动，同时受到磨辊的挤压而被粉碎。粉碎后的物料在磨盘边缘处被从风环进入的热气体带起，粗颗粒落回到磨盘再粉磨；较细颗粒被带到选粉机进行分选，粗粉也返回到磨盘再粉磨，合格细粉被带入袋式收尘器收集作为成品。部分难磨的大颗粒物料在风环处不能被热风带起，通过吐渣口进入外循环系统，在此经过除铁后再次进入辊磨与新喂物料一起粉磨。出收尘器的成品通过空气输送斜槽、提升机等设备送入到成品库中。

TRM Series Cement Vertical Roller Mill System is a one fan finish grinding system. The mixed material is fed to vertical roller mill via belt conveyor and air lock valve. Material in mill internal was moved from center to grinding table edge when grinding table rotates. In the meanwhile, it is stressed and crushed by grinding roller. Crushed material at table edge was brought out by hot gas. Coarse particles were recirculated in the system. However the fine particles were brought to separator for classifying, among which some coarse particles were recirculated back grinding table. Qualified fine powder will be collected by bag filter. Partial hard to grind coarse material not being able to brought by hot gas will be rejected to external circulation. After metal separation, it will, together with new material, fed to vertical roller mill for grinding. Collected fine product will be sent to cement silo through air slide and bucket elevator.

系统流程图如下：

System flow sheet is as the following.

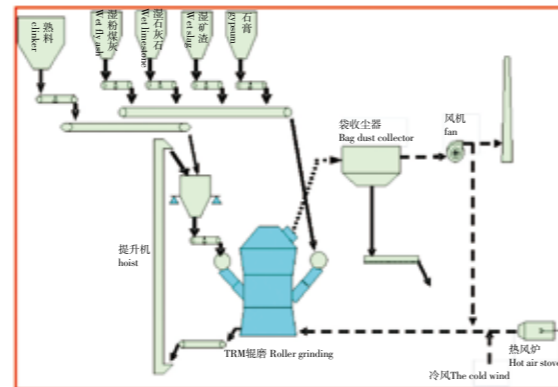


以上是普通的流程，新喂料和外循环料通过同一个喂料溜管进入磨机，该流程针对的是入磨物料综合水分小于2.0%，没有大量高湿物料配料的情况。

针对喂料中含有湿矿渣、湿粉煤灰、脱硫石膏等高湿物料采用从中壳体单独喂料的方式（专利号ZL201020633647.5），解决溜管堵塞的问题，具体流程如下：

The aforesaid is the generally used flow sheet. The material of new feed and external circulation will be fed from the same feeding chute. Such system is specialized for feed moisture less than 2.0% and with no mixing of much high moisture material. Regarding to high moisture feed material including wet slag, wet fly ash, desulfurized gypsum, it will be fed to vertical roller mill separately in order to avoid the choking of feeding chute (patent no. ZL201020633647.5).

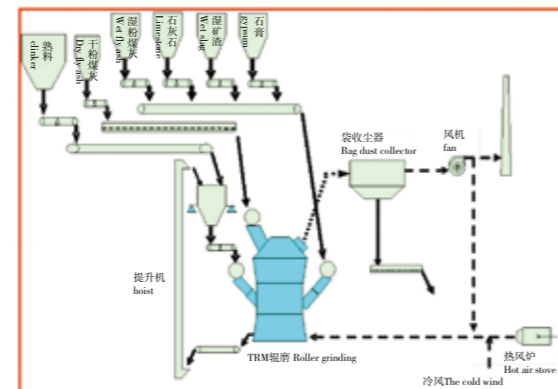
The flow sheet is as the following:



针对生产PC32.5等低标号水泥时会掺加大量的干粉煤灰的情况，采用从选粉机壳体处喂料的方式，防止物料的过粉磨，提高生产效率，具体流程如下：

On condition that it requires to mix a great amount of dry fly ash when producing PC 32.5 cement, the fly ash will be fed from the casing of separator in order to avoid excessive grinding of material and improve the work efficiency.

The flow sheet is as the following:



### 4 TRM型水泥辊磨的型谱

## Spectrum of trm series cement vertical roller mill

磨机规格 Model	TRM32	TRM43	TRM45	TRM50	TRM53	TRM56
磨盘直Do,mm Table Diameter	3200	4300	4500	5000	5300	5600
配用功率kW Installed Power	1600	3150	4000	4500	5000	5400
产品品种 Type of Cement	PO42.5, 比表320~360m <sup>2</sup> /kg PO42.5, Specific Surface Area @ 320~360m <sup>2</sup> /kg					
产量,t/h Capacity	60~70	120~140	150~175	180~210	200~230	220~260
系统电耗,kWh/t Power Consumption of System	26~30					

表中产量基于中等易磨性的物料。

Medium grindability is assumed for the Capacity shown in table above.

### 5 TRM型水泥辊磨的应用

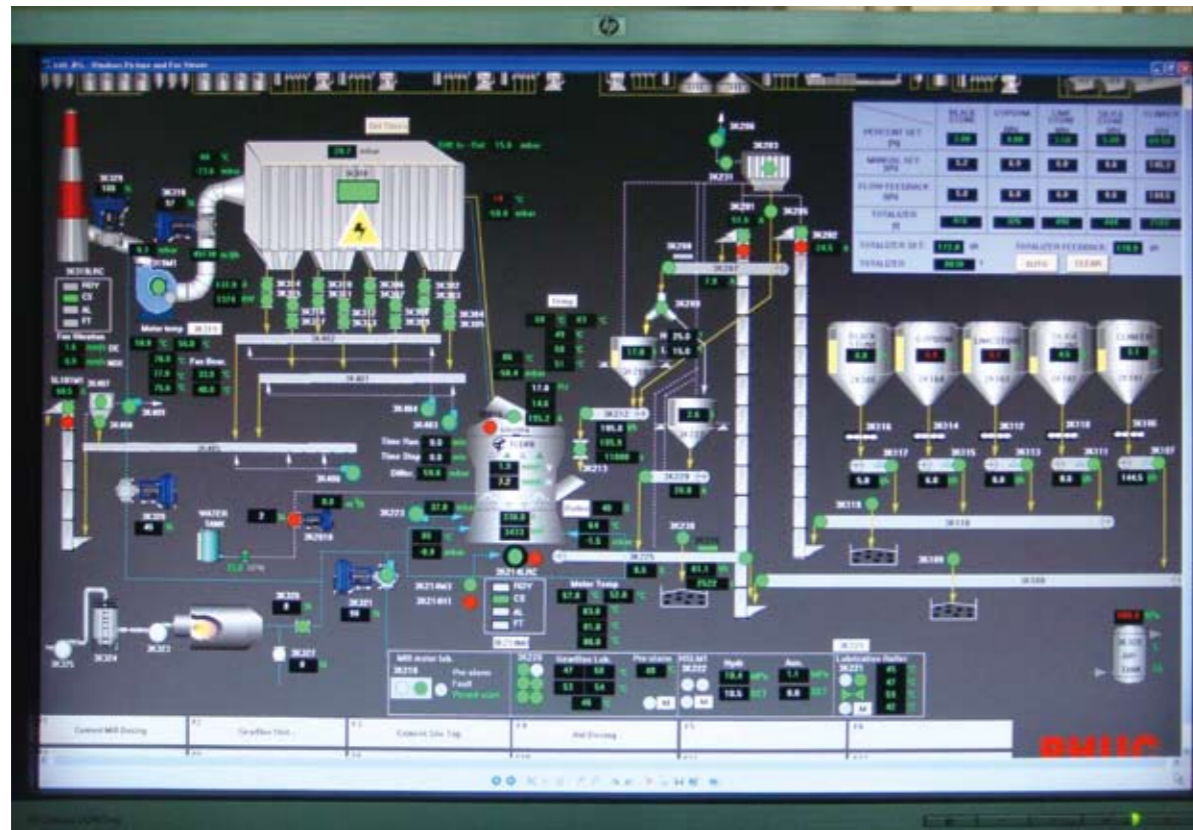
## Application of trm series cement vertical roller mill



● 幸福水泥TRMK4541磨机的外形  
Outline of TRMK4541 of vietnam phuc son cement co., Ltd owned by Taiwan lucky cement group



●幸福水泥TRMK4541磨机的中控操作画面  
CCR operation mimic of vietnam phuc son cement co., Ltd owned by  
Taiwan lucky cement group



●幸福水泥TRMK4541磨机系统运行指标  
Performance of TRMK4541 cement vertical roller mill system

水泥品种 Type of Cement	产量,t/h Capacity	比表面积, m <sup>2</sup> /kg Specific Surface Area	熟料含量,% Clinker	磨主机电电耗 ,kWh/t Power Consumption of Mill Motor	系统电耗,kWh/t Power Consumption of System	需水量,% Water Demand
OPC	150	330	95	21.7	31.3	26.4~27.4
PCB50	155	340	93.5	21.0	30.3	
PCB40	160	360	84	18.1	27.2	

●销售业绩表  
Sales reference

序号 No	规格 Model	规模 Equipped for	数量 Q'ty	使用厂家 Name of Client
1	TRMK45.4	5000t/d	3	台湾幸福水泥有限公司 Taiwan Lucy Cement Co., Ltd
2	TRMK50.4	5000t/d	2	喀什天山水泥有限责任公司 Kashi Tianshan Cement Co., Ltd
3	TRMK45.4	150t/h	2	商洛尧柏龙桥水泥有限公司 Shangluo Yaobai Longqiao Cement Co., Ltd
4	TRMK32.2	60t/h	1	太原金圆水泥有限公司 Taiyuan Jinyuan Cement Co., Ltd
5	TRMK32.2	60t/h	1	朔州金圆水泥有限公司 Shuozhou Jinyuan Cement Co., Ltd
6	TRMK45.4	150t/h	4	陕西尧柏集团浦城分公司 Shaanxi Yaobai Group Pucheng Cement Co., Ltd
7	TRMK45.4	150t/h	2	新疆和田尧柏水泥有限公司 Xinjiang Hetian Yaobai Cement Co., Ltd
8	TRMK45.4	150t/h	1	安康尧柏江华水泥有限公司 Ankang Yaobai Jianghua Cement Co., Ltd
9	TRMK50.2	5000t/d	2	马来西亚 (HUME) 项目 (水泥磨) Malaysia Hume Cement Co., Ltd
10	TRMKS32.2	55t/h	1	河北前进冶金科技有限公司 Hebei Qianjin Metallurgy Technology Co., Ltd
11	TRMKS32.2	5000t/d	1	贵州六盘水豪龙项目 Guizhou Liupanshai Haolong Cement Co., Ltd
12	TRMK50.4	180t/h	1	双鸭山新时代水泥有限责任公司 Shuangyashan New Era Cement Co., Ltd
13	TRMK45.4	150t/h	2	和田鲁新建材有限公司 Hetian Luxin Building Mateial Co., Ltd



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