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链条炉排的侧密封

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摘　要: 以常用的鳞片式链条炉排为例, 阐述了炉排侧密封的重要性, 揭示了迷宫式密封存在的问题和采用接触式密封和饱合式密封的必要性。并对轻型链带式炉排的侧密封进行探讨。

关　键　词: 迷宫式密封; 接触式密封; 跑合密封

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链条炉排运行是机械的回转运动。当炉排上的煤燃烧时, 炉排面受热产生横向热膨胀。回转部分与两侧固定墙板和侧密封块间必须留有足够的间隙, 否则容易造成炉排卡死等机械故障。再加上制造装配误差, 两侧间隙处理不当, 则形成一条纵向通风走廊。链条炉排的配风原则一般是两头小中间大, 中部风室的高压风势必通过两侧通风走廊向前后窜风, 造成配风不均匀, 破坏燃烧工况。特别是向前的窜风, 使燃煤提前不规则的着火, 甚至烧坏煤斗。要处理好两侧的通风走廊, 必须采取措施加强侧密封。

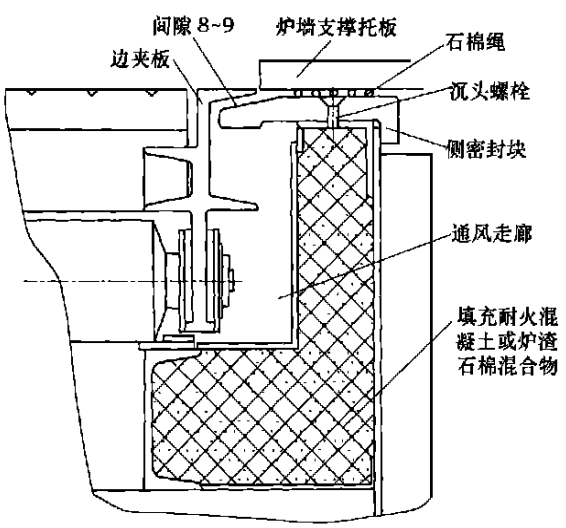

图 1　鳞片式炉排迷宫式侧密封

鳞片式链条炉排的传统侧密封是迷宫式密封, 如图 1 所示。这种密封效果不好, 边夹板与侧密封块之间形成了较为明显的通风走廊, 造成风室间严重窜风。同时较细的煤粒很容易通过 8~9 mm 的间隙落入走廊内, 着火燃烧, 使侧密封块尖部烧坏, 也烧坏通风走廊的密封钢板。通风走廊的截面进一步扩大, 更加剧了风室窜风。侧密封块与炉墙支撑托板之间是用两股石棉绳(直径约为 Φ30)填充密封, 当炉排中部风室风压较大时, 很容易冲坏石棉绳, 造成炉墙侧面漏风。侧密封块与炉排侧墙板是用沉头螺钉连接, 当侧密封块烧坏后, 更换非常困难。

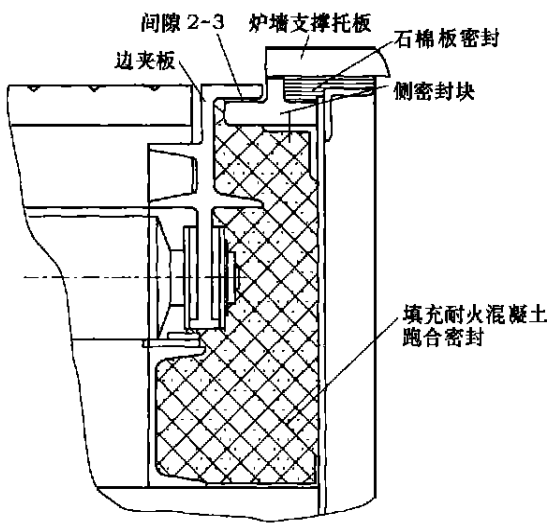

图 2　鳞片式炉排接触式和跑合密封

通过不断改进, 接触式与耐火混凝土浆跑合相结合的密封形式已被采用, 如图 2 所示。淘汰了老式槽铁形结构的边夹板, 新边夹板的边缘与侧密封块上部仅留出 2~3 mm 接触间隙。侧墙板上部与炉墙支撑托板间填充石棉板压紧, 托板之间的间隙用陶瓷纤维和耐火胶泥塞紧, 以上措施实现了上部的接触式密封。下部则采用填充耐火混凝土泥浆跑合密封, 在炉排工地安装冷态试平合格后, 拆除两侧左右边夹板各 2~3 块及 2~3 组炉条, 留出空挡。让炉排减速箱开慢车, 从前到后填充耐火混凝土泥浆,

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边走边填充,后边未拆除的边夹板则紧跟其后刮削泥浆。当全长填满后,炉排继续运行 3 ~4 圈,使耐火混凝土泥浆有良好的跑合,密封更加严密。然后再装上被拆除的炉条和左右边夹板,完成了全部跑合密封程序。有时为了减轻密封重量,也可采用珍珠岩水泥浆,水泥按 30%调配。

跑合密封的机理是利用耐火混凝土泥浆容易刮削的特性,在炉排运行时随着热膨胀的需要随形刮削,不致于和左右边夹板产生硬碰硬的机械故障。而且耐火混凝土刮削后成形性能良好,随形密封严密。

通过多年运行实践,接触式加跑合密封效果很好,而且维修方便。拆除部分边夹板,即可更换侧密封块,填充少许混凝土泥浆也能很容易地修复密封面。

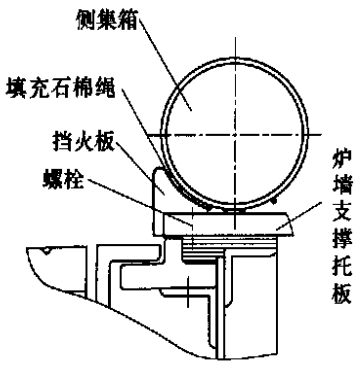

图 3　挡火板结构

除炉排侧密封外,炉墙支撑托板也曾出现烧坏现象。由于托板内侧长期接触燃煤传热,运行 1 ~2 年后托板内侧被烧坏,而且不便更换。烧损严重时还影响炉排侧密封。建议采取如图 3 所示措施来解决。

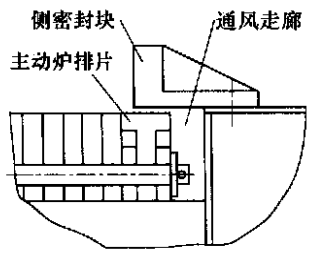

图 4　链带式炉排侧密封

将支撑托板分为两部分,外侧为大托板,材质为普通铸铁,支撑炉墙重量。内侧为可更换的挡火板,结构简单,体积较小,可采用耐热铸铁。下部非向火面用螺钉固定在大托板上,紧靠侧集箱的空间填充石棉物密封,也可利于集箱向下的膨胀。根据实际烧损情况,定期更换挡火板,确保侧密封整体完好。

10 t/h 以上的锅炉采用链带式轻型炉排较多,侧密封形式如图 4 所示。这种侧密封也属于迷宫式密封,两侧形成较大的窜风走廊,两侧的通风强度大于炉排中间部分。上部的侧密封块处于高温燃烧区,极易被烧坏。侧密块下部和炉排面间隙处如夹进异物,还容易造成机械故障。

由于炉排左右端部都是传统的可锻铸铁主动炉排片,很难采用接触式密封。如欲改造,必须重新设计左右端主动炉排片,这样势必增加主动片种类,不能与中部主动片通用。另外由于组装后炉排高度较小,一般为 57 mm,很难采用填充耐火混凝土泥浆跑合密封。

随着各种大块炉排的出现,原小片链带式炉排已呈被淘汰趋势。有一种双列活芯大块炉排不仅完全替代了传统的链带式炉排,而且侧密封比较新颖,如图 5 所示。

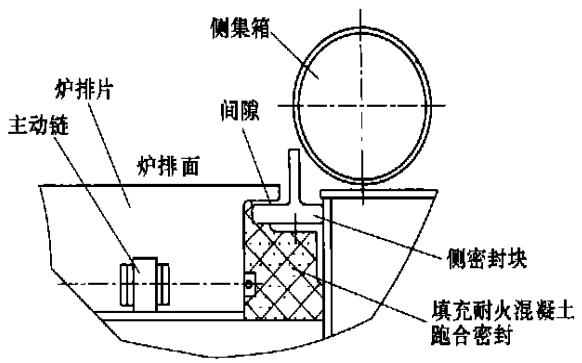

图 5　双列活芯炉排侧密封

这种炉排的主动链为带滚轮的钢板链,位于炉排的下半部,与炉排片的边缘有一定距离。左右炉排片两端可与侧密封块形成 2 ~3 mm 间隙的接触式密封。为了保护主动链,避免高温受热,装配后的炉排高度比传统链带式炉排略高,下部则可以填充耐火混凝土泥浆跑合密封。炉排两侧密封严密,形成了弱风区,同时由于结构紧凑,侧密封块可以靠近两侧集箱,改善了冷却条件,经过多年运行,未发现侧密封块烧坏。侧密封块的更换和维修也很方便,检修时,卸下左右炉排各 2 ~3 块,闪出空挡,将减速箱开慢车,至需要维修处,卸下连接螺栓即可更换侧密封块。

总之,接触式加跑合密封,不仅对鳞片式炉排,而且对轻型大块炉排,只要灵活运用,都能使侧密封收到较好效果。

(复　编辑)

During the operation of a heat recovery boiler some problems have arisen, which include excessive ash buildup on heating surfaces, tube deformation and excessive dust and smoke emissions. Following an detailed analysis of these problems a series of methods were proposed for their effective resolution. **Key words**: heat recovery boiler, ash buildup on heating surfaces, dust and smoke abatement

滑参数停炉、停机的试验研究= **Experimental Study of Boiler and Turbine Shutdowns under the Operating Condition of Sliding Parameters** [刊, 汉] / ZHAO Bing (Kailuan Thermal Power Co., Tangshan, Hebei Province, China, Post Code: 063103) // Journal of Engineering for Thermal Energy & Power. — 2001, 16(5). —554 ~557

The boiler and turbine shutdown of a power plant under the operating condition of sliding parameters was conducted for the first time at Kailuan Thermal Power Co. By carrying out this trial the Co. has accumulated the experience of boiler and turbine shutdown under the sliding-parameters condition, which can serve as an effective guide for a plant shutdown under such circumstances. A detailed account is given concerning the necessity for and requisite conditions of such shutdowns as well as the temporary monitoring measures and specific operation procedures required in this regard. An analysis was given of the influence of such shutdowns on a power plant. Some issues demanding special attention are also presented. **Key words**: boiler, steam turbine, plant shutdown under sliding parameters, test

热力设备水冲击的原因分析及防范措施= **An Analysis of the Causes of Thermal Equipment Hydraulic Shocks and Measures Taken for their Prevention** [刊, 汉] / HUANG Sheng-ji (Wuhan Boilogical Products Research Institute, Wuhan, China, Post Code: 430060), ZHOU Ju-hua (Wuhan Electric Power School, Wuhan, China, Post Code: 430079) // Journal of Engineering for Thermal Energy & Power. — 2001, 16(5). —557 ~559

链条炉排的侧密封= **Lateral Seal of a Chain Grate Stoker** [刊, 汉] / WANG Yu (Harbin Hongqi Boiler Works, Harbin, China, Post Code: 150080) // Journal of Engineering for Thermal Energy & Power. — 2001, 16(5). —560 ~561

With commonly used fish-scale type chain grate stoker serving as an example the author cites the importance of lateral seal for a grate stoker. After an enumeration of the existing problems specific to a labyrinth seal the necessity of employing contact and running-in type seals was expounded along with an exploratory study of the lateral seal for a light-type chain grate stoker. **Key words**: labyrinth seal, contact seal, running-in seal

常压热水锅炉供暖系统安装错误事例分析= **An Analysis of the Mistakes Identified During the Installation of the Heat Supply System of a Constant-pressure Hot-water Boiler** [刊, 汉] / HOU Yun-tao (Boiler and Pressure Vessel Inspection Institute under the Harbin Municipal Labor Bureau, Harbin, China, Post Code: 150076) // Journal of Engineering for Thermal Energy & Power. — 2001, 16(5). —562 ~563

锅炉的计算效率与燃料的高低位发热值的关系= **Relationship Between the Calculated Efficiency of a Boiler and the Low and High Calorific Value of Fuel** [刊, 汉] / GAO Fei, YANG Wei-liang (Harbin Boiler Works Co. Ltd., Harbin, China, Post Code: 150046) // Journal of Engineering for Thermal Energy & Power. —2001, 16(5). —564 ~565

The thermal efficiency of a boiler and its various heat losses calculated through the use of low calorific value of fuel were compared with those calculated respectively on the basis of high calorific value of fuel. The relation among various heat losses was established to facilitate mutual conversion. **Key words**: boiler efficiency, calorific value, various heat losses

有效控制汽轮机变工况运行= **Effective Control of Steam Turbine Off-design Operation** [刊, 汉] / WANG Jin-ming (Huaibei City Thermal Power Plant, Huaibei, Anhui Province, China, Post Code: 235029) // Journal of Engineering for Thermal Energy & Power. — 2001, 16(5). —546