

DJM 陶瓷复合铸造刮板技术介绍

DJM ceramic composite casting flight bar technology introduction

刮板机槽道中的物料受到刮板及链条在运动方向的压力及物料本身质量的作用，在散体之间产生了内摩擦力，这种内摩擦力保证了散体之间的稳定状态，并大于物料在槽道中滑动而产生的外摩擦阻力，使物料形成了连续整体的料流而被输送。刮板输送机在使用中，要承受拉、压、弯曲、冲击、摩擦和腐蚀等多种作用，必须要有足够的强度、刚度、耐磨和耐腐蚀性。由于它的运输方式是物料和刮板链在槽内滑行，运行阻力和磨损都很大，刮板是承载构件，由 16Mn 钢（或 40Cr，42CrMo）制成，直接垂直于链条连接。刮板链是牵引构件，由两块钢板冲压成型后焊接成一链杆，再用销轴连接而成。在工作过程中，刮板要克服很大的摩擦阻力，承受很大的动载荷和静载荷，所以刮板要具有较高的强度、韧性和耐磨性。

刮板输送机使用环境恶劣，工作负荷大，其失效形式主要是自身各部件之间以及与矸石或煤炭的剧烈摩擦而引起的磨损失效，为了提高刮板的耐磨，强度及韧性，DJM 选用高锰钢基高铬复合陶瓷铸造制作刮板，采用粉末冶金制芯结合铸造烧结工艺，在浇铸工程中利用高铬复合陶瓷材料降低高锰钢钢水温度，利用高铬复合陶瓷材料中的合金元素细化高锰钢晶粒，提高高锰钢基体性能，充分发挥高锰钢的加工硬化特点，减少刮板塑性变形，提高抗冲击能力；结合高铬复合陶瓷材料的高耐磨特性，提高刮板工作面的抗磨性能，从而获得即耐磨且抗冲击的刮板。

或利用悬浮浇注方法在高锰钢浇注时随钢液注入高铬铁粉，陶瓷微粉及颗粒，从而降低钢水浇注温度，细化晶粒，减少缩孔，提高结晶取向的随即性，增强低冲击工况下的耐磨性能的作用。充分发挥高锰钢的加工硬化特点，减少斗齿尖部塑性变形，提高抗冲击能力；结合高铬复合陶瓷材料的高耐磨特性，提高刮板工作面的抗磨性能，从而获得即耐磨且抗冲击的刮板。

While the material in the scrapper channel moves, the internal friction in the material is generated by the pressure against scrapper chain and its own gravity, which will keep the material steady. This friction is greater than the outside one as the material slide in the channel, so the material is transported continuously as a whole. The scrapper flight bar should be strong, stiff, wear resistant and corrosion resistant, because it will bear a lot of force such as tension, pressure, bending, impact, friction and corrosion during the transporting. The scrapper chain move together with material in the scrapper channel, so both resistance and abrasion is great. The flat bar, made of 16Mn(or 40 Cr, 42CrMo), is the bear carrier and connected vertical to the chain. During operation, the flight bar will bear great resistance, dynamic load and static load, so the flight bar should be strong, stiff and wear resistant.

In order to improve the wear resistance and impact resistance of the flight bar, DJM use the composite of high Cr and ceramic on steel base. We adopt the powder metallurgy core making and casting sintering, during pouring the composite of high cr and ceramic is put to reduce the temperature of molten manganese steel, the alloy element in the composite are used to refine the high manganese steel grain to

improve the performance of high-manganese steel, give full play to the capacity of self hardening under impact and improve the ability of impact resistance;

High wear-resistant properties of composite of high Cr and ceramic will greatly improve the wear resistance of flight bar surface, thus resulting in flight bar of both high impact and wear resistance.

We also can use the method of suspension casting, put high Cr powder and ceramic powder into the molten steel during pouring to reduce the temperature, refine grain, reduce shrinkage and increase the randomness of Crystallization to improve the wear resistance under low impact. The self hardening of the high Mn steel can reduce the plastic deformation and improve impact resistance. High wear-resistant properties of composite of high Cr and ceramic will greatly improve the wear resistance of flight bar surface, thus resulting in flight bar of both high impact and wear resistance.

Product include:

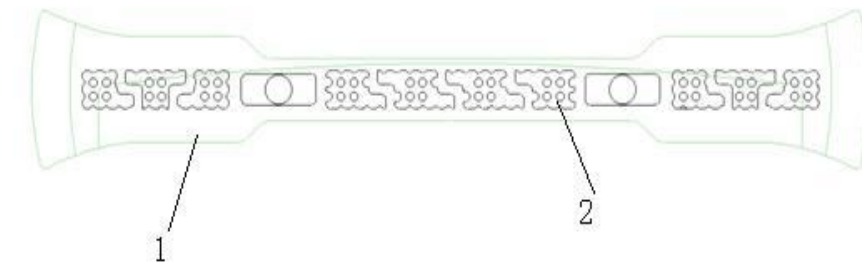
Martensite steel

Martensite steel + ZTA ceramic particles

Froged in 42CrMo, 40Cr, 20SiMn 16Mn, 40Mn2, 27SiMn

附图-1 陶瓷复合刮板示意图

Picture -1 external view of ceramic composite flight bar



Position-1 basis--martensitic steel

Position-2 Ceramic composites

附图-2 马氏体钢陶瓷复合刮板外观图

Picture-2 Martensite steel ceramic flight bar external view

附图-3 局部放大图

Picture-3 partial enlargement of appearance





Mechanical property of Martensite steel: (after heat treatment) Hardness:

Tensile strength: >1600 Mpa Yielding point: > 1400 Mpa Impact: akv (J/cm²) ≥30J

Basis Material= Martensite Steel Hardness: ≥ HB380

Wear-resisting layer Hardness: ≥ HB420

Ceramic particules Hardness: ≥ HV1400