



CBCS系列电缆输送系统

Series CBCS Cable Belt Conveying System

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一、CBCS系列电缆输送系统简介

随着集装箱起重机装卸速度的日益提高，原有的拖令与拖链系统已难以满足高速工况的要求。CBCS电缆拖带系统经ZPMC三年多努力，完成了试制、试验、应用、改进的曲折历程，目前以其高速平稳的优点，已具备取代老式拖令和拖链的能力。

CBCS (Cable Belt Conveying System) 系列电缆输送系统是由ZPMC研发宁波分公司配套生产的带式电缆输送装置（简称：拖带）。其具有以下特点：

1、拖带系统无需配置动力，能随小车作同步的往复移动，最高设计速度为350m/min，运行平稳自如。解决了原有拖令系统中的拖令相互间的碰撞和自行式附加动力的问题，同时也解决了塑料拖链系统的运行速度较低，偶有拱起倒落事故隐患；

2、由滑车支承的输送带，呈类刚性状态，能适应在任何风载、振动、频繁换向的工况下作业，且安全可靠。这一特点解决了原有拖令系统中的电缆缠绕现象，以及塑料拖链环节多、维护复杂、成本高等现象；

3、拖带系统结构简单，活动关节少，调整简单方便，大部份零件采用不锈钢制作，能与主机同寿命。

现CBCS拖带系统主要有两种形式：用于桥吊和轨道（轮胎、龙门）吊。两种拖带工作原理近似，动力均由主机带动，参见图1、2。

I. Brief

Following the increasing speed of cranes download and upload, origin towing and towline cannot be satisfied the working condition, CBCS cable conveying system which is designed by ZPMC is a good replacer to satisfied the more and more quick speed working conditions.

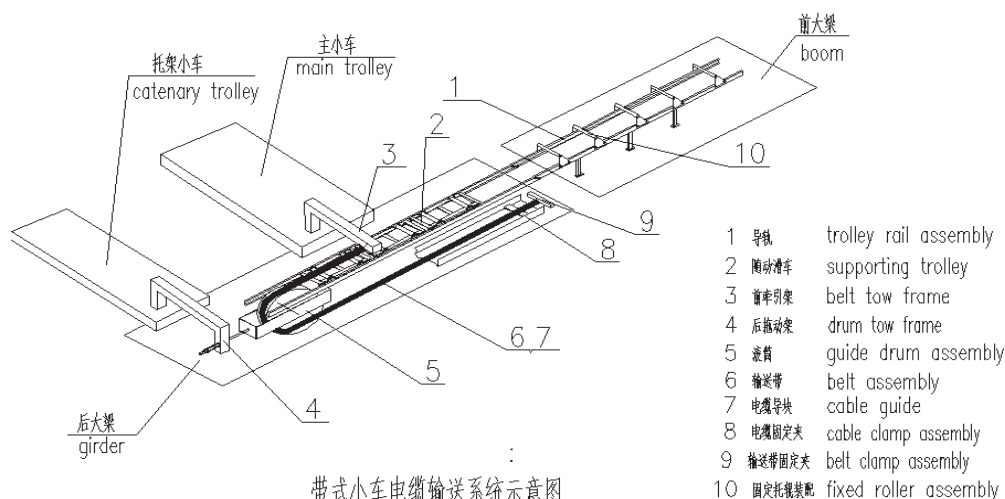
CBCS (Cable Belt Conveying System) has some characteristics below:

1. CBCS needs not to configure power, it can move following the trolley synchronous, the max speed can up to 350m/min, it runs stability and smoothly. it is resolved the impact in old system, and accessional power, and also is resolved low speed problem in plastic towline system, occasional the hump up or purler problem happens.

2. A slip-trolley supporting belt, is rigidity state, can adapt any wind, vibrate, frequency Reversing working condition, safety and reliable. It also resolved cable winding problem in old towing system. And very many link in plastic towline, with complex maintenance and high cost.

3. CBCS is very simple structure, little link, easy to adjusting, almost of parts is made of stainless steel, their service life is similar as main machine.

The CBCS has two forms: One for QCC, and the other for RMG&RTG. The working principle of them is also Approximate, and both is driven by main machine. see fig1, fig2.



带式小车电缆输送系统示意图
trolley cable belt conveying system

图1、桥吊拖带系统
Fig1 QCC CBCS

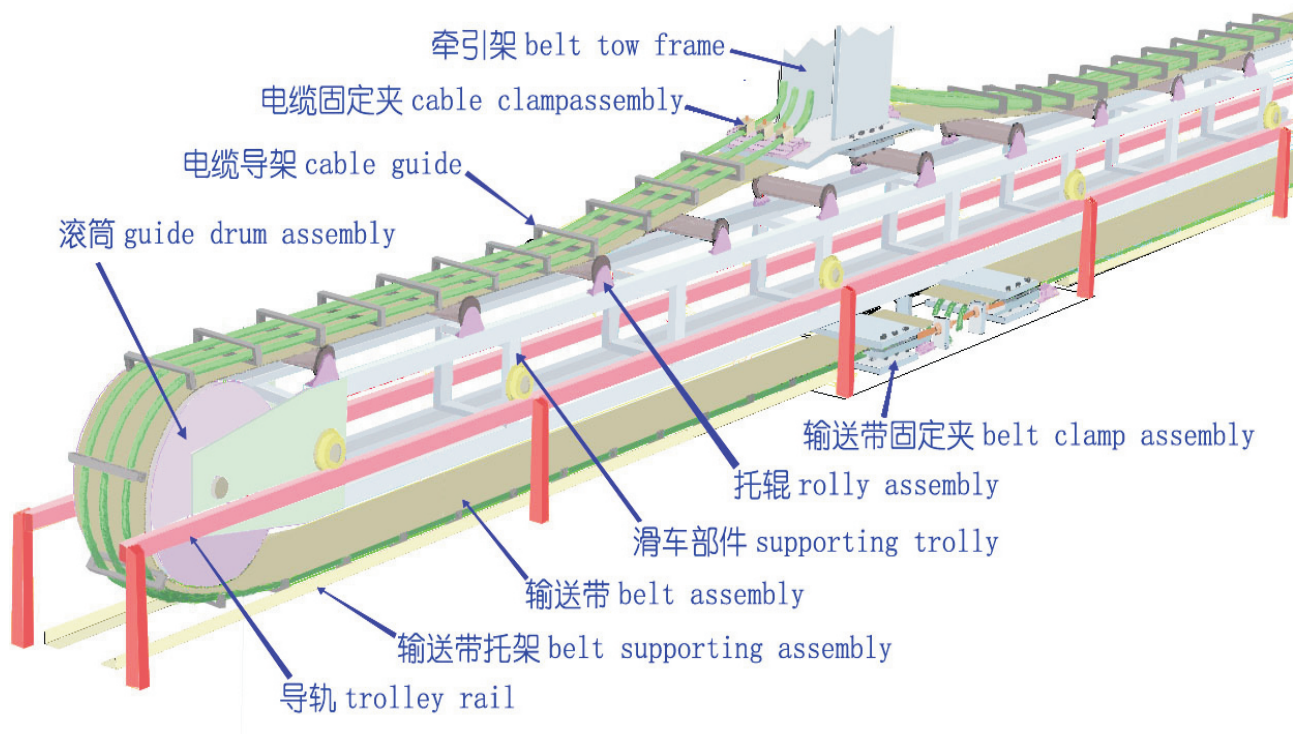


图2、轨道(轮胎、龙门)吊拖带系统
Fig2 Rail(RMG,RTG) crane CBCS

二、标记

II. Sign

CBC	1	2		
			2-输送带宽220	2-Conveying belt width 220
			3-输送带宽300	3-Conveying belt width 300
			1-桥吊形式	1-QCC form
			2-轨道(轮胎、龙门)吊形	1-Rail crane (RTG&RMG) form
			电缆输送装置代号	Code for cable belt conveying

三、具体选型的相关参数

III. Selection

拖带形式 CBCS Form	拖带代号 CBCS Code	输送带宽度(mm) Belt Width(mm)	电缆导缆块 Cable guide block	电缆与电缆导块选型 Cable and cable guide blockselection
桥吊(图1)	CBC12-00	220mm	单层 Monolayer	请参照图5和式1 See fig5 & form1
QCC(Fig1)	CBC13-00	300mm		
轨道(轮胎、龙门)吊(图2)	CBC22-00	220mm	单层 Monolayer	请参照图6、表2和式2 See fig6, table2 & form2
Rail crane (RTG,RMG) Fig1	CBC23-00	300mm	单层 Monolayer	
			双层 Two layer	

四、选型示例

IV. Example of Selection

1、选型前提：

对于选型有以下相关的具体要求：

A、产品的使用场合及工况要求：适用温度为-40℃~50℃、相对湿度不大于95%，最大可操作风速8级（蒲福级），最大可承受风速12级（蒲福级）；

B、产品的运行极限行程；

C、电缆的相关参数，如：电缆外径、电缆最大弯曲半径、电缆的数量及质量，且重点为选用的电缆必须为橡塑材质的拖链电缆，最大外径小于 $\Phi 36\text{mm}$ ；

2、选型的方法：

A、首先根据使用场合及工况不同确认拖带系统的形式：一般岸桥工况选用如图1形式的桥吊拖带系统，场桥工况选用如图2的轨道（轮胎、龙门）吊拖带系统；

B、根据电缆的外径和数量，对于拖带系统中的输送带进行选型。输送带有两种规格，分别为：220mm宽和300mm宽。具体请按下列示例进行：

a. 电缆的最大外径小于 $\Phi 36\text{mm}$ ；

如桥吊形式拖带系统中的电缆输送带采用单层(如图3)，轨道(轮胎、龙门)吊形式的拖带系统的电缆输送带可采用单层或双层（如图4）。

1. Selection prerequisite:

Below requirement for selection:

A. Working condition & application:

Temperature range is -40~50℃, relative humidity less than 95%, Max operating wind speed 8 grade(Beaufort class), Max suffering wind speed is 12 grade(Beaufort class);

B. Running max travel;

C. Cable's parameters, such as: cable diameter, cable max bend radius, quantity and quality, It is important that the cable must be towline cable and the skin's material must be rubber plastic, the max outside diameter less than $\Phi 36\text{mm}$;

2. method of selection:

A. First decide the form of CBCS: In general, QCC use form1(see fig1), and RTG & RMG use form2 (see fig2);

B. Decide CBCS's belt according to cable outside diameter and number, the belt has two forms: 220mm width and 300mm width. following below example to select.

a. Outside diameter of cable is less than $\Phi 36\text{mm}$;

others, Cable conveying belt of QCC's CBCS is monolayer (fig3), and of RTG & RMG's is monolayer or two layer(fig4).

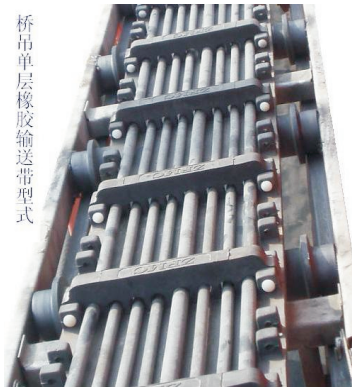


图3 桥吊单层橡胶输送带型式
Fig3 The monolayer rubber belt of QCC's CBCS form

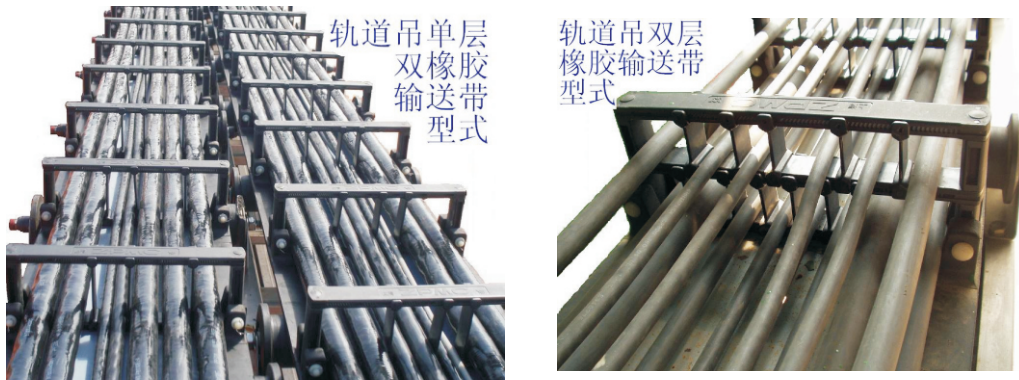


图4 轨道吊单层/双层橡胶输送带型式
Fig4 The monolayer/two layer rubber belt of RTG&RMG's CBCS form

C. 桥吊形式的具体选型如图5，具体的计算公式如式1；

C.QCC CBCS form select see fig5, calculate function see function1

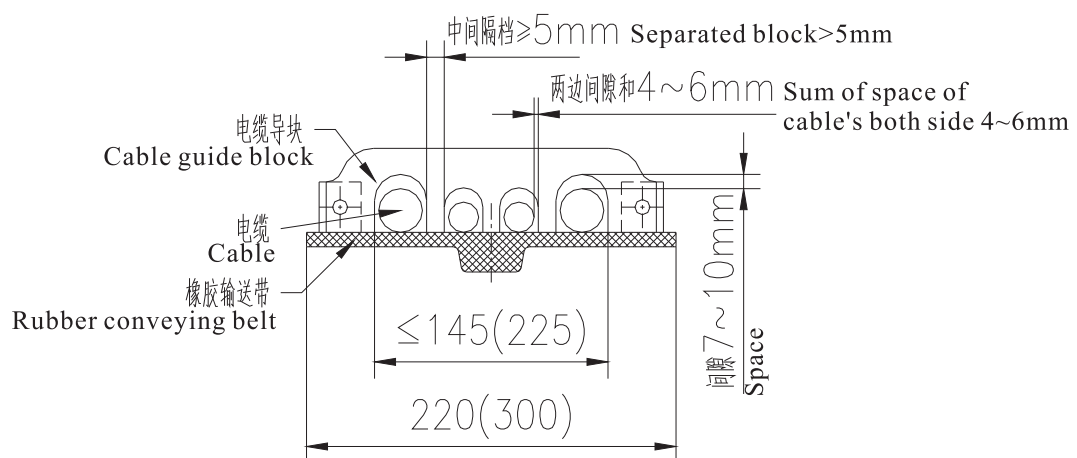


图5 Fig5

橡胶输送带的宽度（如图5取值220mm或300mm）

= {所有的电缆直径相加和+ (电缆根数 × 两边间隙和4~6mm*) + [(电缆根数 -1) × 中间隔档*)] } ≤145 (225) (式1)

*详见图5的相关尺寸

注：电缆布置时采用橡胶输送带两边最粗，越靠近输送带中心越细，

这一电缆直径大小基本左右对称原则进行，并且动力电缆和控制电缆最好左右分开布置，如无法做到电缆直径左右对称原则，则要求动力电缆带屏蔽层。

轨道（轮胎、龙门）吊的具体选型如图6，并对照表2进行；

Rubber conveying belt's width(fig5,let value is 220mm or300mm)

= {sum of all cable diameter+(cable number × Space of cable's both side 4~6mm*)+ [(cable number-1) × Separated block*)] } ≤145 (225) (Function1)

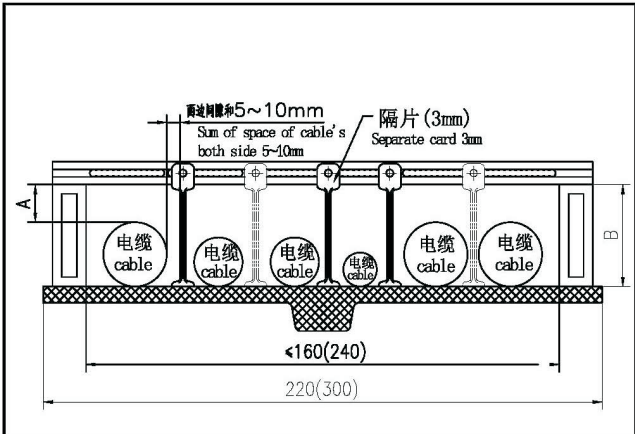
*Detail dimension see fig5.

Note: Cable alignment on belt is thick cable at side of belt and thin cable in centre of belt;

Align cable by diameter value on belt

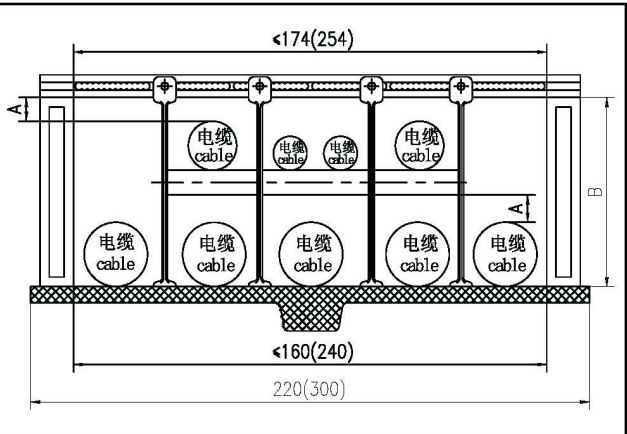
symmetrically, and the power cable must be separated with the control cable to symmetrically align on belt centre. if the cables can not Symmetrical align on belt, so the power cable need shielding layer.

RTG/RMG's selection see fig6, and ref table2;



轨道吊单层橡胶输送带型式

The monolayer rubber belt of RTG/RMG's CBCS form



轨道吊双层橡胶输送带型式

Fig4 The monolayer rubber belt of RTG/RMG's CBCS form

表2				Table2
轨道吊橡胶带型式 Rubber belt form od RTG/RMG' s CBCS		电缆外径 Cable outside diameter (mm)	A (mm)	B (mm)
单层(如图6左) Monolayer(fig6 left)		≤ Φ 26	≥14	40
		≤ Φ 32	≥22	54
		≤ Φ 36	≥44	80
双层(如图6右) Two layer (fig6 fight)	上层 upside layer	≤ Φ 26	≥12	100
	下层 bottom layer	≤ Φ 26	≥22	
		≤ Φ 36	≥12	

对于轨道吊形式橡胶输送带宽度的选用按式2进行:

橡胶输送带的宽度 (如图6取值220mm或300mm)

= {单层所有的电缆直径相加和 + (电缆根数 × 两边间隙和 5~10mm) + [n* ×

隔片厚度 (3mm)]} ≤ 160 (240) (式2)

* 为单层隔片的数量

注: 电缆基本采用橡胶输送带截面由粗向细左右对称布置, 隔片选用的原则为外径不同的电缆之间用隔片 (如图6隔片实线表示), 如相同外径的电缆间隙太大 (≥15mm) 或电缆的外径小于图6中0.5B可按图6中加隔片 (如图6隔片虚线表示)。

五、产品应用

目前CBCS电缆拖带系统已广泛应用于: 美洲 (美国长滩SSA、阿根廷)、欧洲 (比利时、荷兰、土耳其)、大洋洲 (新西兰)、亚洲 (韩国、印度、台湾高雄、台湾台北)、非洲 (塞内加尔)、国内 (珠海、广州南沙、舟山、上海洋山港和外高桥、南通、张家港、南京、青岛、烟台、大连) 等全球五大洲。

CBCS拖带系统以其高速平稳、安全可靠、维护简便的优异性能, 正逐步被广大用户所接受。

六、订货需知

订货时需提供电缆规格表或电缆排列图。对于特殊规格的电缆拖车, 如双层电缆拖车等, 请与我具体联系。

Select belt width of RMG/RTG according to function2 below:

Rubber belt width(fig6, let value 220mm or 300mm)

= {sum of all one layer cables' diameter + (cable number × sum of space of cable's both sides 5~10mm) + [n* × separated card thickness (3mm)]} ≤ 160 (240) (function 2)

n* is number of one layer separated cards

Note: Cable alignment on belt is thick cable at side of belt and thin cable in centre of belt symmetrically; Separated card is use between different diameter cable nearby, (Fig6, separated block is Solid line express), separated card will be add if space ≥ 15mm between similar diameter cable nearby, or cable outside diameter less 0.5B in fig6 (fig6, separated card is dotted lines express).

V. Product Application

Now CBCS is widely use at: America (SSA of USA, Argentina), (Europe (Belgium, the Netherlands, Turkey), Oceania (New Zealand), Asia (South Korea, India, Taiwan, Kaohsiung, Taipei, Taiwan), Africa (Senegal), domestic (Zhuhai, Guangzhou Nansha, Zhoushan, Shanghai Yangshan Port and Shanghai, Nantong, Zhangjiagang, Nanjing, Qingdao, Yantai, Dalian) and so on five continents.

CBCS, its high-speed stable, safe and reliable, excellent performance and easy maintenance, is gradually being accepted by the vast numbers of users.

VI. Ordering notice

Please Provide cable specification and cable arrangement figure in ordering. For other special cable towing trolleys, such as double layers cable, etc., please link us.

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New Zealand QCC's CBCS



台湾高雄岸桥使用现场
Taiwan, Kaohsiung QCC's CBCS



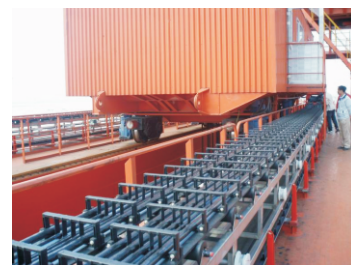
青岛使用现场
Qingdao, QCC's CBCS



大连场桥的安装运行现场
Dalian, RTG/RMG's CBCS



大连岸桥使用现场
Qingdao, QCC's CBCS



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