SCM

C7036-16T 塔式起重机

TOWER CRANE

使用说明书(第一册)

SERVICE MANUAL (NO.1)

四川建设机械（集团）股份有限公司

SICHUAN CONSTRUCTION MACHINERY（GROUP）CO.,LTD.

本说明书只适用于 SCM 认可的人员，用于塔机的安装和拆卸!

This notice is only intended for pesonunel authorized to carry out erection and dismantling of the machine by the firm SCM.

本说明书中中标有“警告、注意、非常重要”的语句，涉及到施工的安全，敬请注意!

Pay attention to the sentences marked with “Warning, Notice or Very Important” in this service manual, which involves safety of construction.

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重要提示

Important Note

感谢您选用我公司产品！为保证安全并使设备发挥最大作用，在安装和使用塔机前，必须认真阅读本产品安装使用说明书。

Thank you to choose the products of our company ! In order to ensure the safety and equipment to maximum effect, before installation and use of tower crane, you must carefully read the product installation instructions.

塔机使用时必须严格遵守以下规定：

The use of tower crane must strictly observe the following provisions:

①.严禁任何超载作业；

Tower crane is rigorous any overload operation.

②.工作时最大风力等级≤6 级(V_w≤20m/s)。

When the maximum wind level is more than 6, the tower crane can't be used. (V_w≤20m/s)

③.非工作时最大风力等级≤10 级(V_n≤35.8m/s)。

The wind level of geographical where tower crane is used is no more than 10. (V_n≤35.8m/s)

④.安装、顶升和拆卸时，必须符合以下规定：

When installing，jacking and disassembly，it must meet the following rules.

◎.最大风力等级≤5 级(V_w≤10m/s)。

The maximum wind level must be no more than 5.(V_w≤10m/s)

◎.在顶升前，必须对塔机进行配平。

When jacking, it is forbid to operate hoist mechanism, slewing mechanism，luffing mechanism, traveling mechanism and other mechanism.

⑤.在非工作时，顶升套架必须放置于塔身最低位置。

When not working condition, the lifting frame must be placed in the lowest position of the tower.

⑥.在安装和使用时，必须严格遵守以下相关规范：

When installing and using the crane, it must strictly abide by the following rules:

◎.《JG/T100-1999 塔式起重机操作使用规程》

JG/T100-1999:Tower cranes specification for operation.

◎.《JGJ196-2010 建筑施工塔式起重机安装、使用、拆卸安全技术规程》

JGJ196-2010:Technical specification for safety installation operation and dismantlement of tower crane in construction

◎.《GB/T5031-2008 塔式起重机》

GB/T5031-2008:Tower crane

◎.《GB/T5972-2009 起重机钢丝绳保养、维护、安装、检验和报废》

GB/T5972-2009:Cranes-Wire ropes-Crane, maintenance, installation, examination and discard

因产品在不断更新，产品细节与安装使用说明书不一致时，请以实物为准。如有疑问请向我公司售后或开发部咨询！

Because of the products constantly updated, product details and installation instructions when there are differences, please in kind prevail. Such as the products have any questions, please consult company after-sales or development department.

目 录 Content

1.性能表 Characteristics List

1.1 外形尺寸 Outline Dimensions

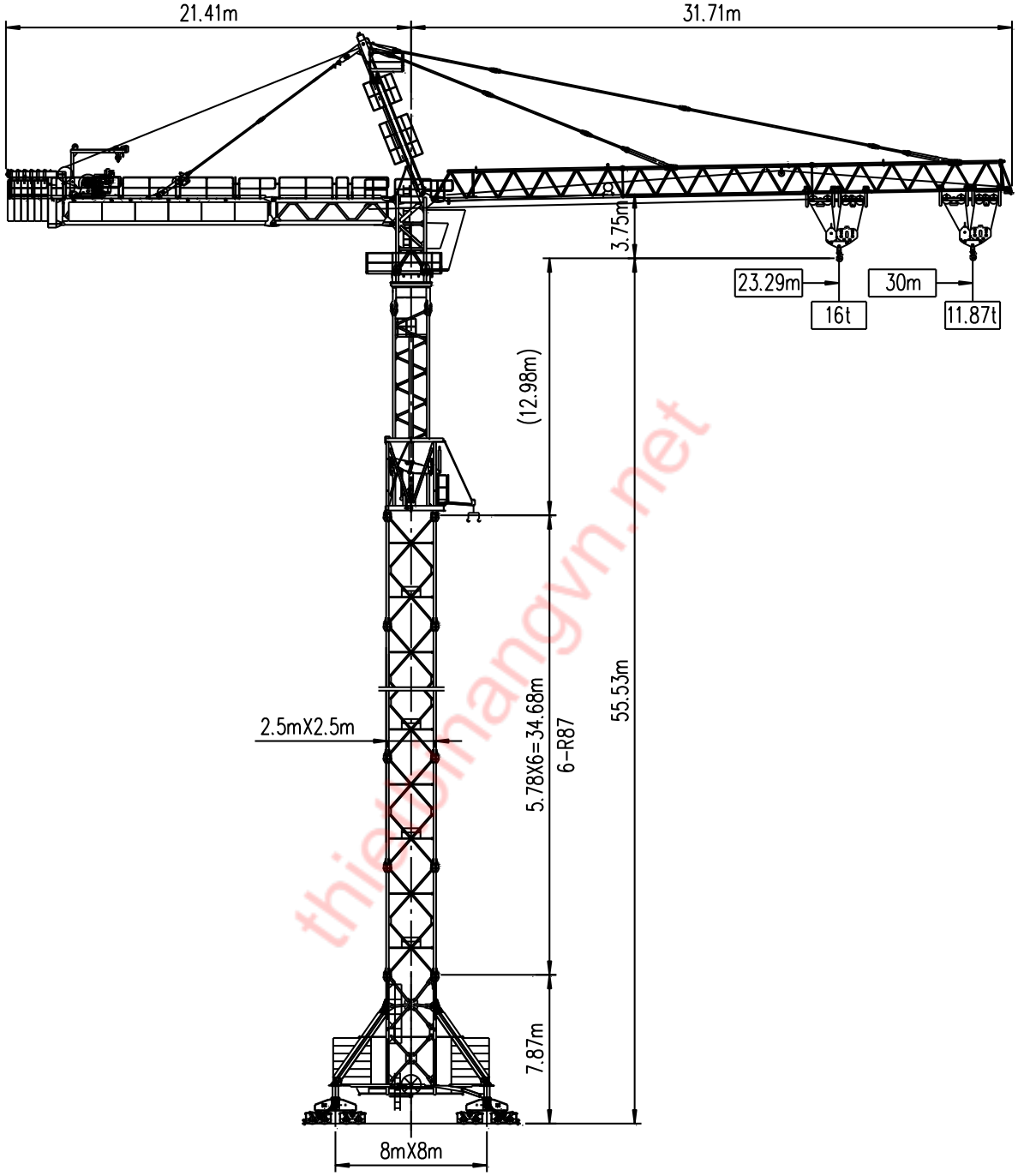
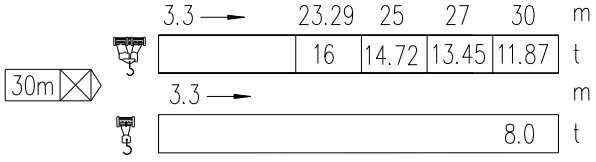


图 1-1 整机外形 Fig. 1-1 Outline Dimensions

1.2 负荷特性表 Load Diagrams



1.3 机构特性 Specifications Mechanisms

表 1-1 Table 1-1

名称 Name	代号 Models	倍率 Fall	速度(m/min) Operating	吊重 Load	绕绳量 Rope Length	电机功率 Motor
起 升 Hoisting	122LVF40NB	a=2	0～47.5	8t	800m ＞800m ★	90kW
			0～71.25	5.2t		
			0～95	2.8t		
		a=4	0～23.75	16t		
			0～35.6	10.4t		
			0～47.5	5.6t		
变 幅 Trolleying	8DVF	0-44m/min				5.5kW
回 转 slewing	24RVF	0～0.7 r/min				2×9kW
行 走 Traveling	22TVF(T)	0~25m/min				4×4kW
电 力 Mains	380V-50Hz 440V-60Hz	150kVA				

★根据用户特殊要求提供。To Be Supplied As Per Client's Specific Requirements.

1.4 起升高度 Hoisting Height

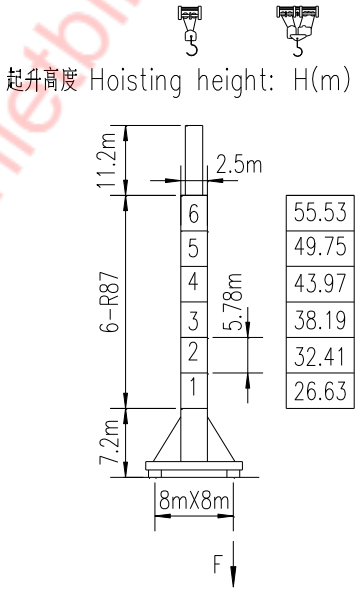


图 1-2 起升高度 Fig. 1-2 Hoisting height

表 1-2 Table 1-2

轮压 Reactions	工作状态 In service	非工作状态 Out of service	塔机自重(无吊重、无配重、无压重、独立高度) Without load and ballast with maximum height.
F(t)	90.4t	109.3t	125t

2.场地准备 Preparing The Site

2.1 场地与空间 Space Requirements For Erection

2.1.1 说明 Introduction

这部分载有塔机的空间要求尺寸。

This brochure contains the dimensions for the space requirements of the crane.

它由两部分组成：

It is split up into two groups:

a.标有主要尺寸的整体塔机简图。

The general crane lay-out with the main dimensions

b.将塔机按三个部分进行说明：底盘、塔身、塔头。

The crane is represented in three parts: Chassis, Tower mast, Tower head

以上所给尺寸较细致，可使立塔环节更为精确完美。

The dimensions are detailed in such a way that the setting up of the machine can be prepared in a more precise and complete manner.

注意：所给尺寸是理论上的，并未考虑有载荷或无载荷时的变形。

ATTENTION: the indicated dimensions being theoretical, especially they do not take into account the deformations without load or with load.

2.1.2 整机 Complete crane

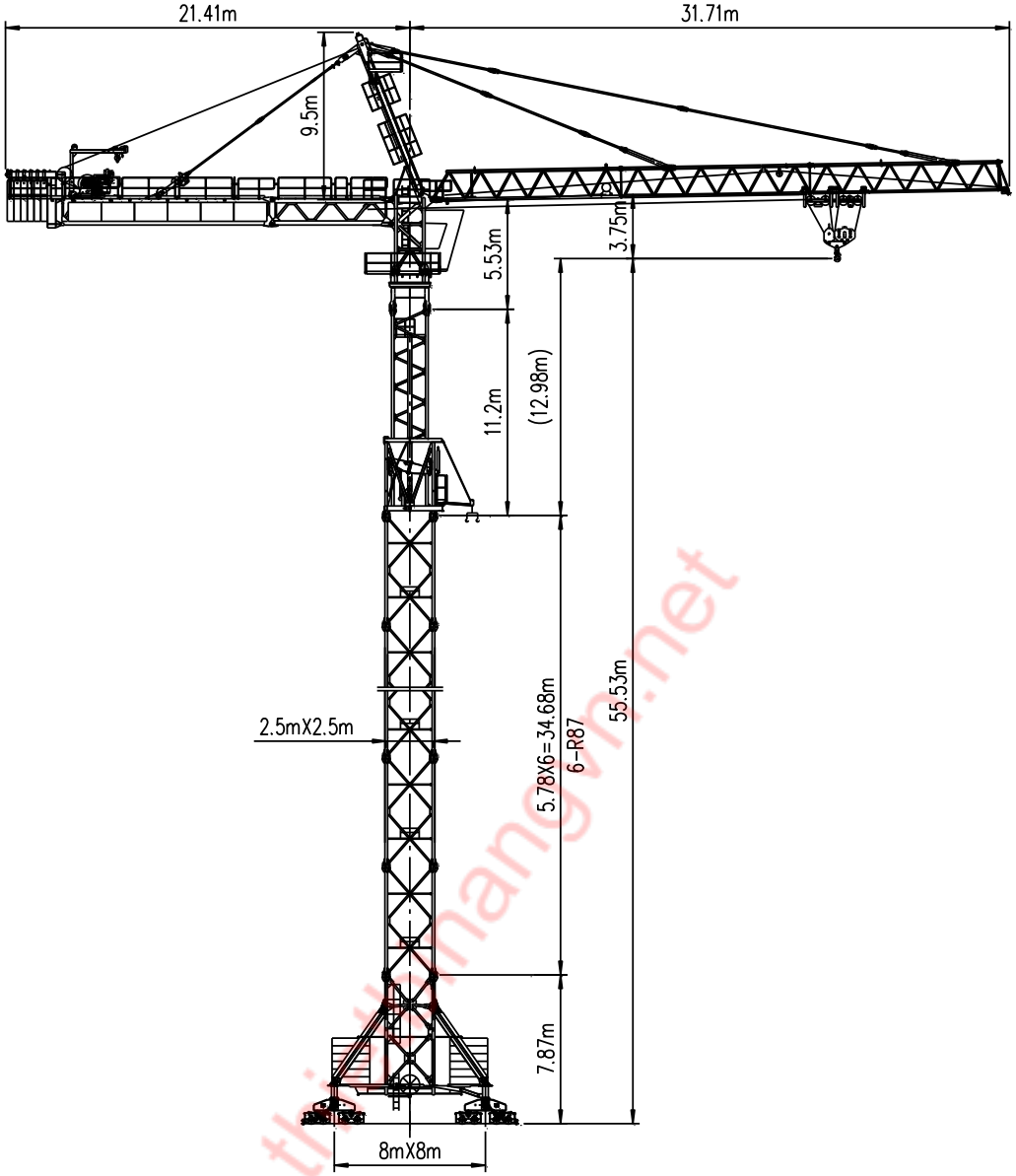


图 2-1 整机 Fig. 2-1 Complete crane

2.1.3 底盘 Chassis

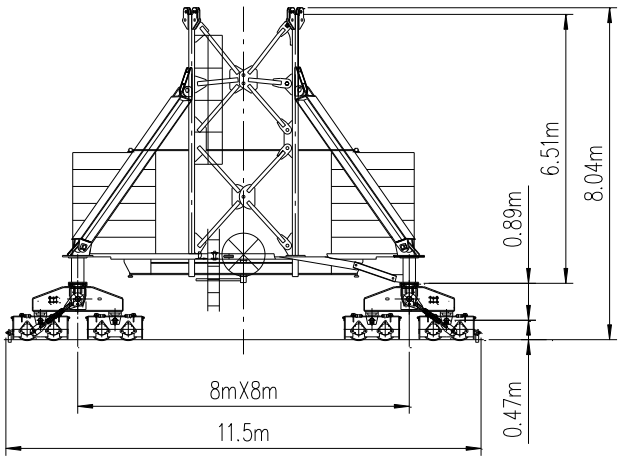


图 2-2 底盘 Fig. 2-2 Chassis

2.1.4 塔身 Tower mast

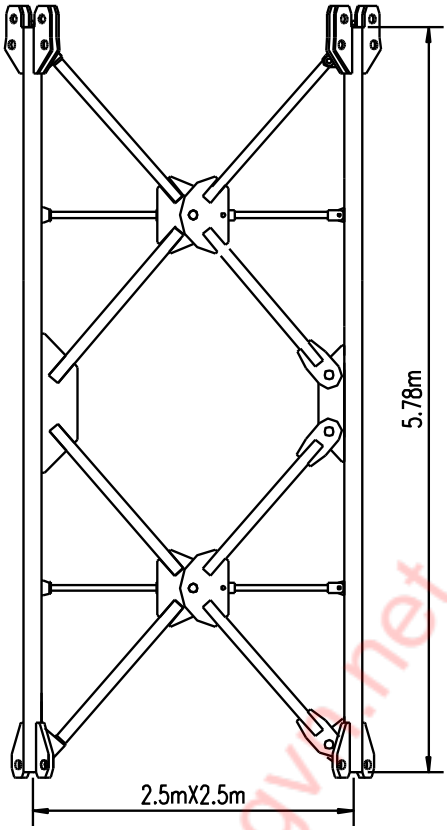
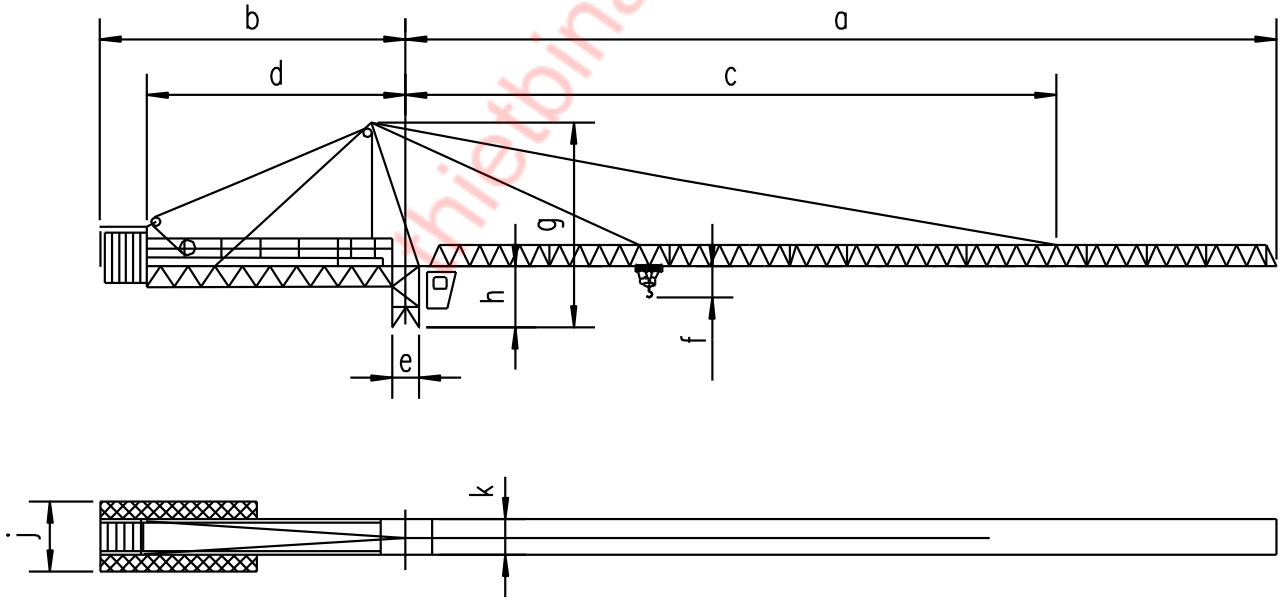


图 2-3 塔身 Fig. 2-3 Tower mast

2.1.5 塔头 Tower Head



幅度 Jib	a (m)	b (m)	c (m)	d (m)	e (m)	f (m)	g (m)	h (m)	j (m)	k (m)
30m	31.7	21.41	28.758	18.5	1.8	3.75	13.9	5.75	3.224	1.60

图 2-4 塔头 Fig. 2-4 Tower head

2.2 轨道 Tracks

2.2.1 轨道选择 Choosing The Track

路轨尺寸必须适应下列要求：

The track dimensions must correspond to the requirements imposed either by:

a.轨道：

The material which determines:

a).轨距

The rail width

b).由塔机高度决定的台车轮压

A pressure per bogie depending on the working height of the crane

轨距和最大台车轮压见后表：

The rail width and the maxi bogie pressure are shown on the following table and in the data sheet.

b.地面：

Or by the ground:

地面承压力均匀或不均匀性。

Homogeneity or non homogeneity of its pressure.

轨道类型：

Types of tracks are possible, i, e:

a).混凝土轨枕轨道，

Track on concrete strips.

b).木枕轨道。

Track on wooden sleepers.

2.2.2 轨道铺设 Track Laying

所用轨道：

Rail to be used:

钢轨断面必须适于支撑行走轮，轨冠最大宽度为 70mm。应使用标准钢轨和附件。

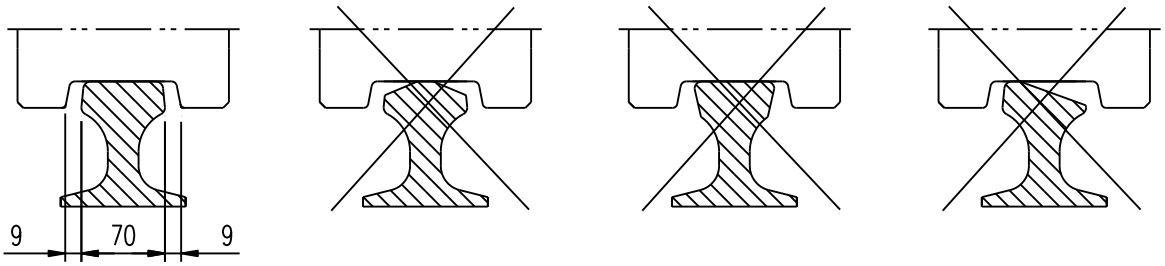
The rail section must be suitable for the wheels it support: maximum head width 70mm. The best rail to use is one which is slightly worn as this has a good bearing surface. It is preferable to use standardized material (rails and accessories) as shown in the table below.

用户应根据不同的轨枕联结方式，按最大水平力和垂直力选择钢轨其他断面尺寸。

The user must choose the other dimensional characteristics of the rail according to how latter will be connected to the concrete strips or to the broad flanged girder (HEB) and according to the maximum vertical or horizontal reactions.

水平力大约为垂直力的 10%。

The horizontal reaction amounts to about 10% of the vertical reaction.



好稍有磨损的轨道	新轨接触面小	磨损太大	单侧磨损
Good slightly worn rail	New rail poor bearing surface	Over worn rail wheels wear	Rail worn on one side poor bearing surface

图 2-5 轨道 Fig. 2-5 Rail

轨道应进行认真设计和铺设：The track must be carefully designed and laid. It must be:

a.纵向和横向完全水平。

Perfectly horizontal (longitudinally and transversely)

b.安装在坚硬的基础上。

Well bedded down on a solid base.

c.两轨平直，两轨平行。

Perfectly straight and with the rails absolutely parallel.

d.全长上使用同一型号的钢轨。

Made up of the same type of rails throughout its length.

e.至少在距轨端 1m 处，安装停止器。

Fitted with rail stops placed at least 1m before the end sleeper.

f.正确接地(按本国标准考虑)。

Correctly earth (according to the standards of the country considered)

g.立塔所需最短轨道长度见《立塔场地尺寸》部分。

For the erection, 2 minimum length of track is required(see drawing<site dimensions for erection>)

轨道中间应填平至轨脚面高度，以便现在塔机行走正常。

The center portion of the track must be banked up to the level of the rail foot so as to ease the traveling of the site machines.

注意：给出后面的图仅是作为一种说明，它们只用于承压力 20N/cm^2 的均匀土壤。用户负责铺设水平轨道，要求轨道能够承受最大台车反力而不引起局部下沉。

IMPORTANT: The follow drawings are given as an indication only. They exclusively apply to a homogenous soil with a resistance of at least 20N/cm^2. The crane user is responsible for the laying of the track which must be perfectly level and capable to the maximum bogie reaction of the machine without causing any local subsidence.

2.2.3 轨距和弯道半径 Track Widths And Radii Of Curvature

8m 底盘所需的轨距为 8m(两轨中心间的距离)，如图 2-6 所示。

The 8m chassis uses the 8m Rail width (the widths between the rail axes).See in Fig.2-6.

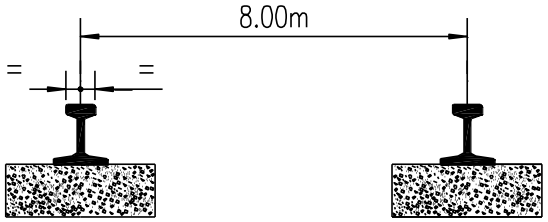


图 2-6 轨距 Fig. 2-6 Track Widths

弯道半径指半径的最小值，如图 2-7 所示。

The radii of curvature are the recommended minimal radii.See in Fig. 2-7.

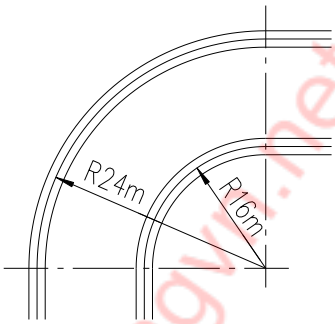


图 2-7 弯道半径 Fig. 2-7 Radii of curvatur

轨距不变，弯道半径可以加大，必要时才使用最小弯道半径。

Any greater radii can be negotiated without any gauge correction. It is recommended to use the minimal radius in cases of real necessity.

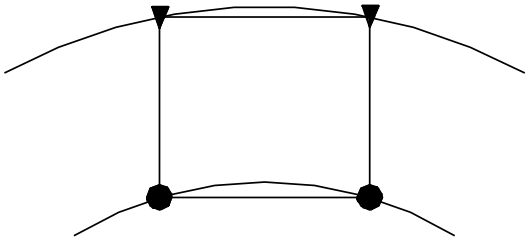
塔机在弯道上行走应配相应的弯轨底盘**(请向我们提出咨询)**。

Traveling over the curves stated is only possible if the chassis are equipped accordingly **(Consult us)**.

8m 轨距转弯半径

8m Track widths Radii of curvature

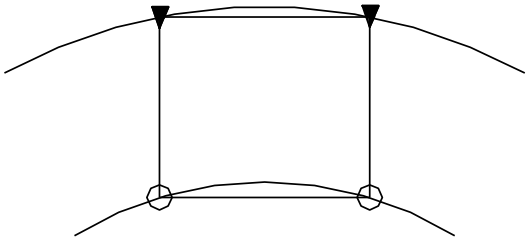
未调整轨道 Track uncorrected



最小弯道内径：30m

Minimum inner radium: 30m

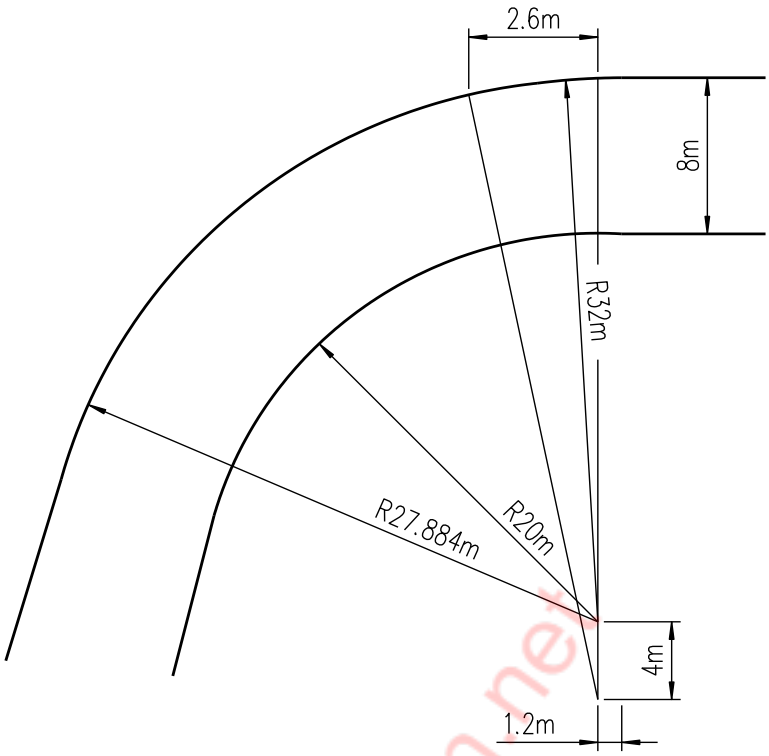
调整轨道 Track corrected



最小弯道内径：20m

Minimum inner radium: 20m

图 2-8 最小弯道半径 Fig. 2-8 Minimum radii of curvatur



8m 轨距时最小弯道半径：20m
8m Track corrected, minimum inner radius: 20m

图 2-9 最小弯道半径 Fig. 2-9 Minimum radii of curvatur

2.2.4 混凝土轨枕轨道 Tracks On Concrete Strips Or On Slabs

a.符号和说明 Explanation and symbols (Example):

举例：3 HA 10×1100 e:150

表 2-1 Table 2-1

符号 symbols	说明 Explanation	符号 symbols	说明 Explanation
3	钢筋数量 number of bars	HA	高强度钢筋 round steel with high adherence
10	钢筋直径 iron diameter in(mm)	1100	钢筋长度 unit length of iron in(mm)
e:150	钢筋间距(mm) spacing in(mm)		

部分符号和说明如表 2-2 所示

Part symbols and explanation see in Table 2-2

表 2-2 Table 2-2

符号 symbols	**说明** Explanation			**符号** symbols	**说明** Explanation
A.H.B	上下钢架的搭接 overlapping upper and lower steel			L.B	下层 lower layer
P.R	每米钢枕重量(kg) weight of rail per meter in kg			L.H	上层 upper layer
T.R	钢轨型号 the type of rails			Z.N	中间层 neutralized zone
350kg/m^3	水泥用量 Concrete proportioning			525 号	混凝土标号 Cement quality
LR.=45t max	纵向轨枕的垂直反力最大为 45t. Longitudinal sleeper for vertical reactions 45t max				
LR.55-75t max	纵向轨枕的垂直反力最大为 55t-75t longitudinal sleeper for vertical reactions from 55t to 75t max				
L.B	下层 Lower layer	L.B.$n^0$1	下一层 The first lower layer	L.B.$n^0$2	下二层 The second lower layer

b.垂直反力最大 115t 至 130t 的枕木。

The Longitudinal Sleeper For Vertical Reactions 115t to 130t max

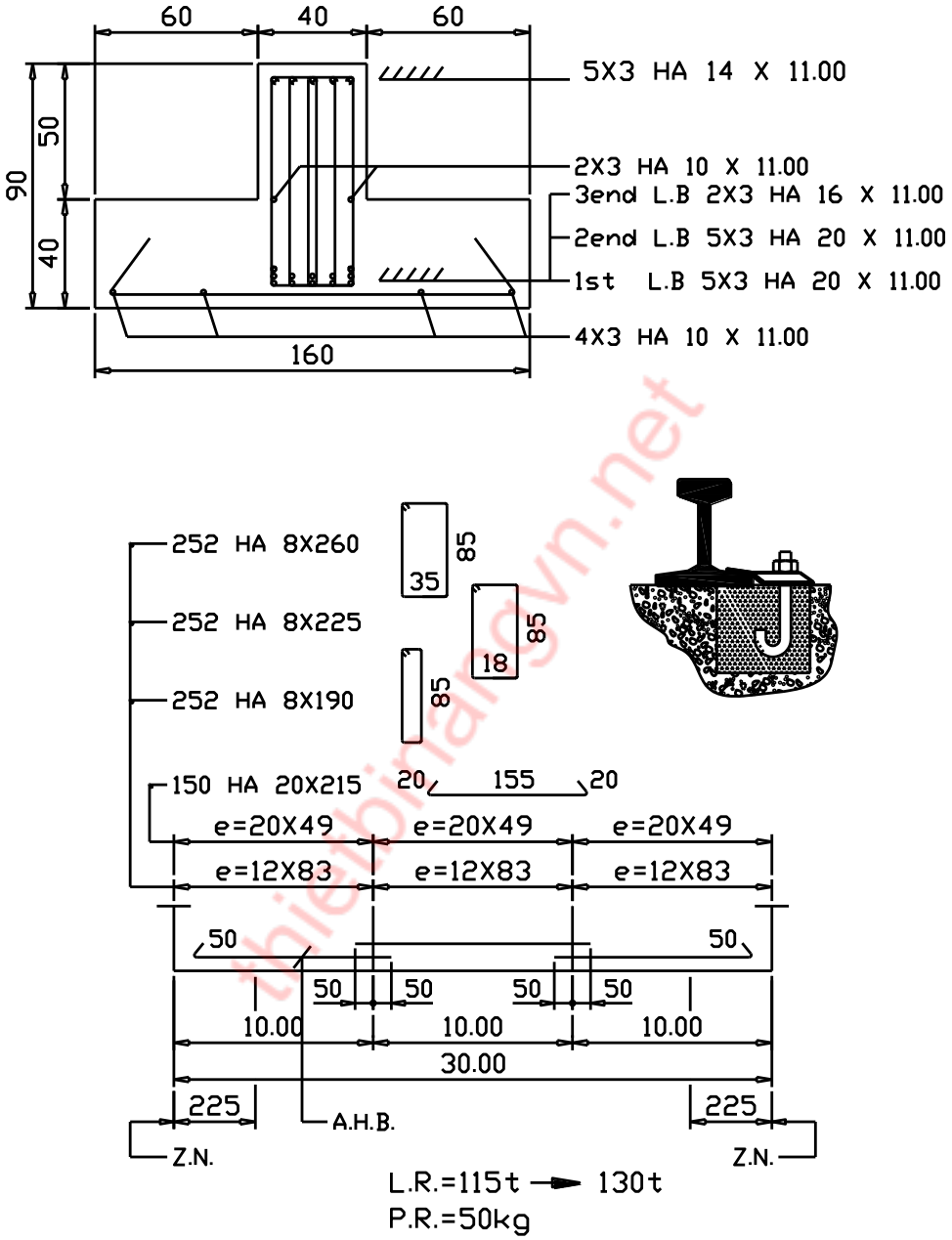


图 2-10 枕木(115t~130t) Fig. 2-10 The longitudinal sleeper(115t~130t)

c.垂直反力最大 175t 的枕木

The longitudinal sleeper for vertical reactions 175t max

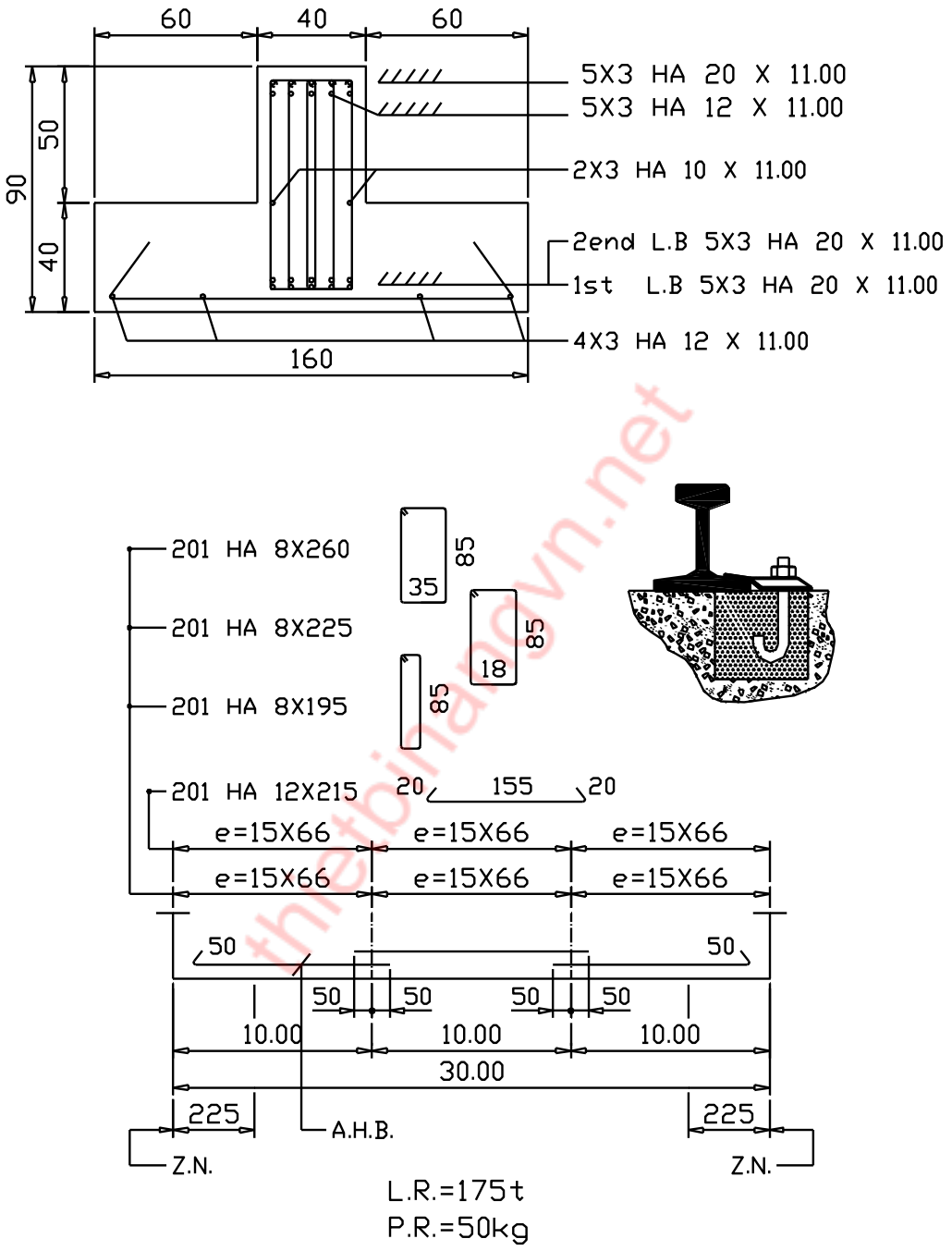


图 2-11 枕木(175t) Fig. 2-11 The longitudinal sleeper(175t)

d.混凝土轨枕的组装

The Concrete Sleepers Assembly

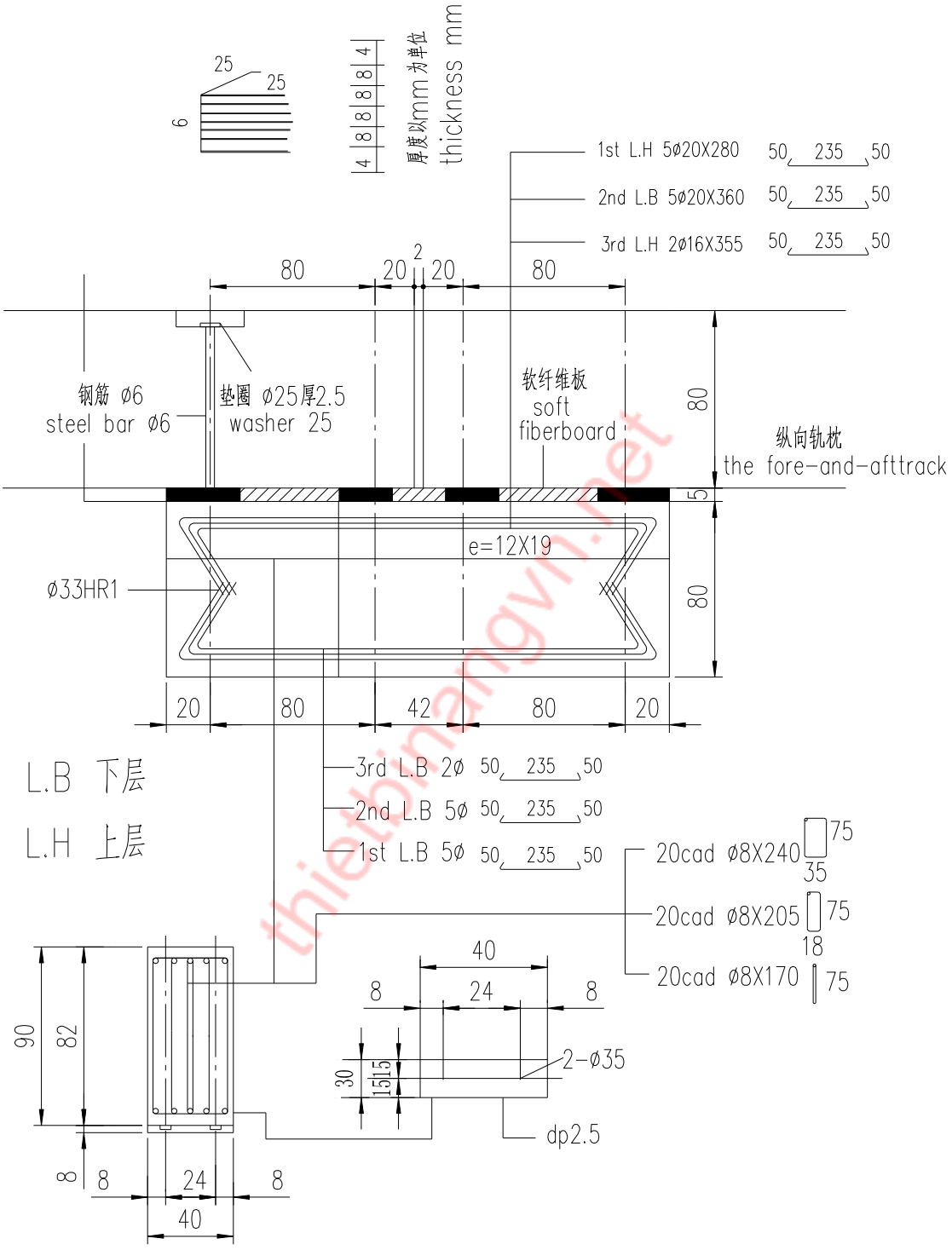


图 2-12 混凝土轨枕的组装 Fig. 2-12 The Concrete Sleepers Assembly

e.混凝土轨枕的连接

The Concrete Sleepers Connection

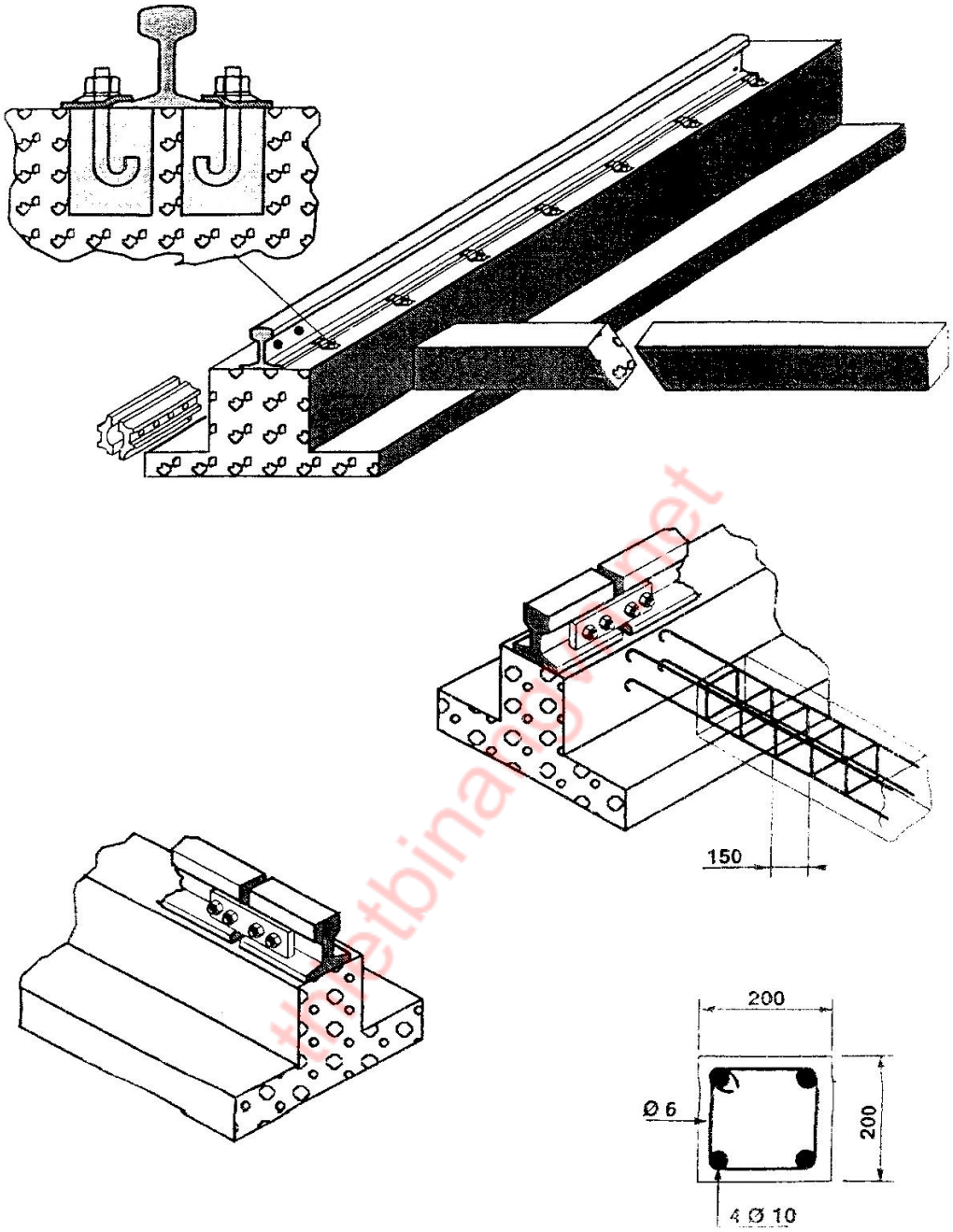


图 2-13 混凝土轨枕的连接 Fig. 2-13 The concrete sleepers connection

非常重要：纵向枕轨中各连接梁的间距与轨距相同

Very Important: the distance between the connecting members of the fore-and-aft Rail sleepers is the same as between Rails.

2.2.5 木枕轨道 Rails On Timber Sleepers

a.说明与符号

Explanation and symbols

铺设轨道用的部件应按支座反力 R 来确定。

The elements used for the track construction are determined in relation of the R reaction.

最大地基承压力 20N/cm^2 (在各种情况下)

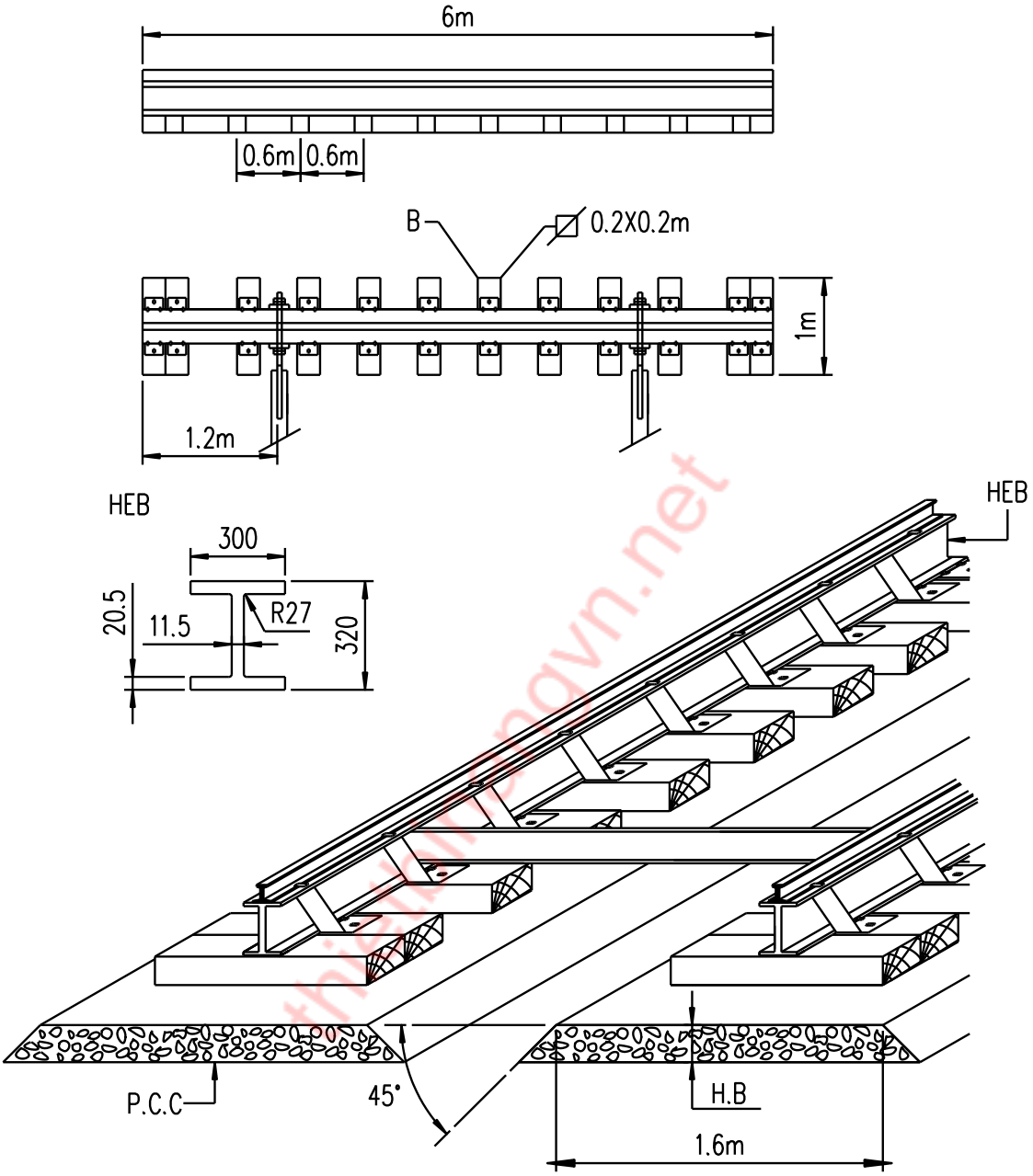
Maximum ground pressure 20N/cm^2 (in all cases).

表 2-3 Table 2-3

符号 symbols	说明 Explanation	符号 symbols	说明 Explanation
R	最大支座反力(t) Maximum reactions at t	H.B	路基高度 (mm) Height of ballast in mm
H.E.B	高度(mm) Height in mm	P.R	每米钢轨重量(kg) Weight of rail per meter in kg
B	杂木轨枕 Oak sleepers	P.C.C	夯实渣石 40/60mm Compacted broken stones 40/60 in mm
T.R	钢轨型号 Type of rail		

b.木枕上的轨道反力 90t~110t

The Rail On The Wooden Sleeper Reactions 90t~110t

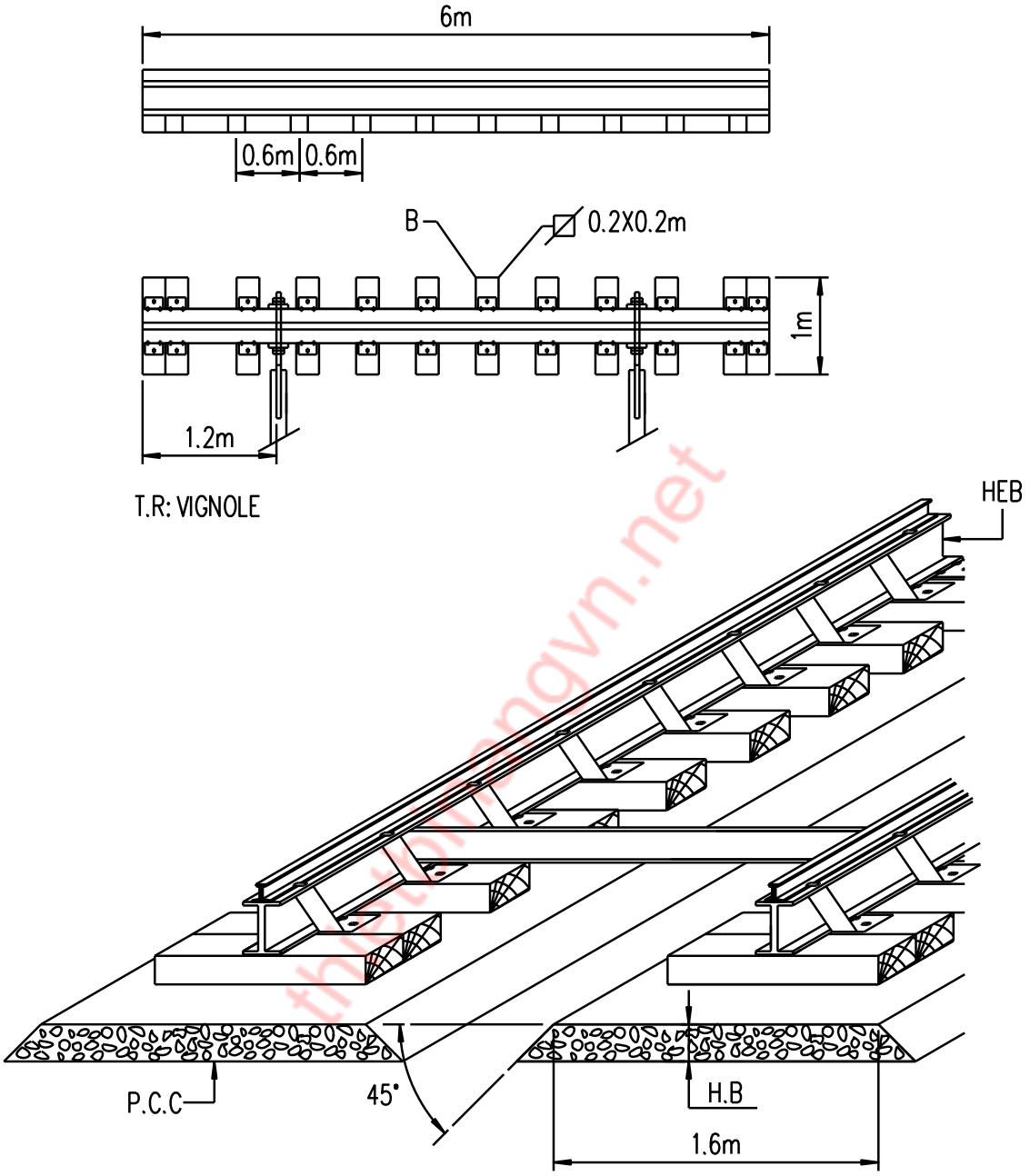


R	H.E.B	H.B	P.R
110t	320	350	50
100t	320	300	50
90t	320	250	50

图 2-14 木枕上的轨道反力 90t~110t Fig. 2-14 The rail on the wooden sleeper reactions 90t~110t

b.木枕上的轨道反力 110t~130t

The Rail On The Wooden Sleeper Reactions 110t~130t

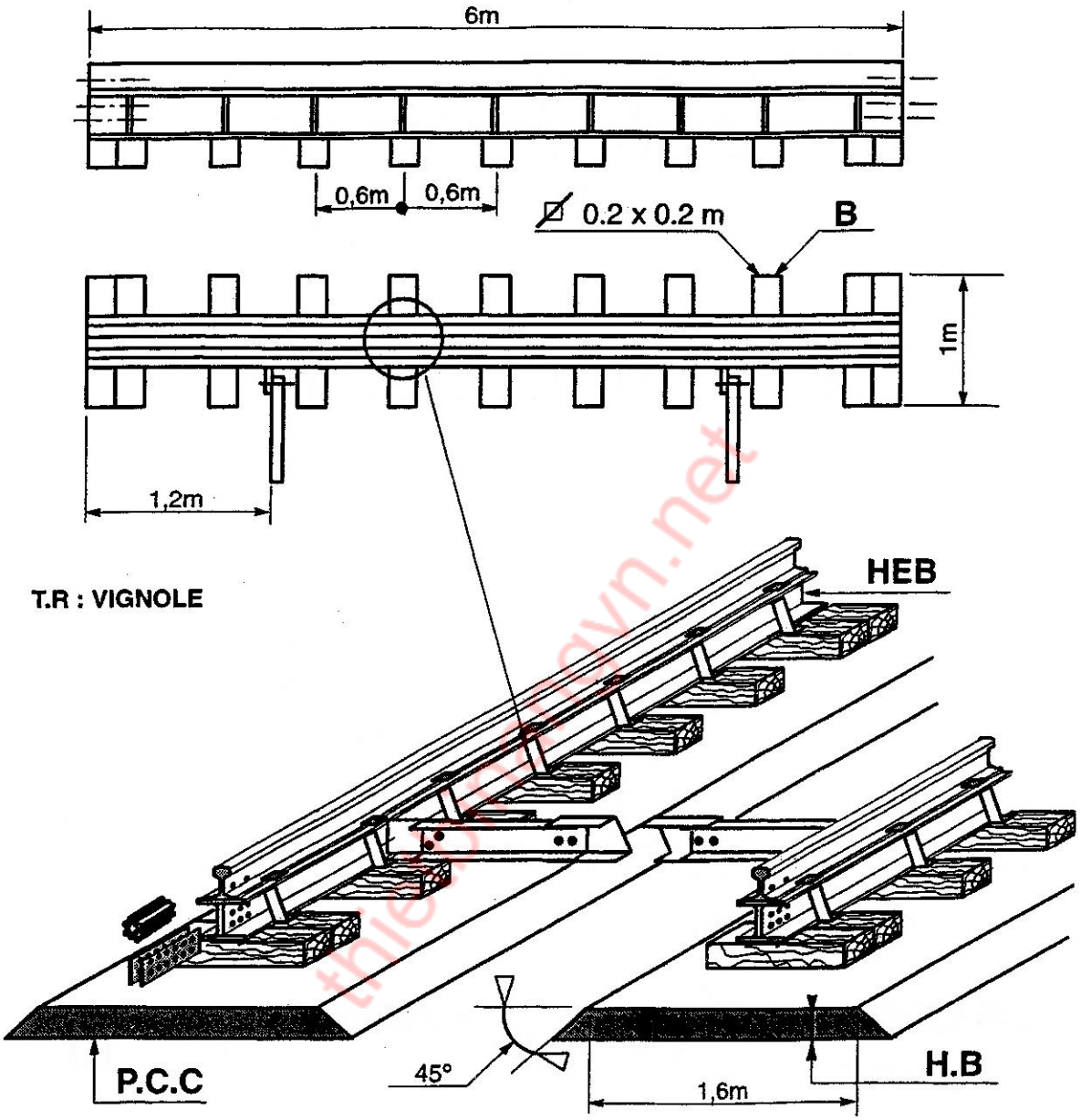


R	H.E.B	H.B	P.R
130t	360	400	54
120t	360	350	54
110t	360	300	54

图 2-15 木枕上的轨道反力 110t~130t Fig. 2-15 The Rail On The Wooden Sleeper Reactions110t~130t

c.木枕上的轨道—反力 130t~150t

The rail on the wooden sleeper — reactions 130t~150t

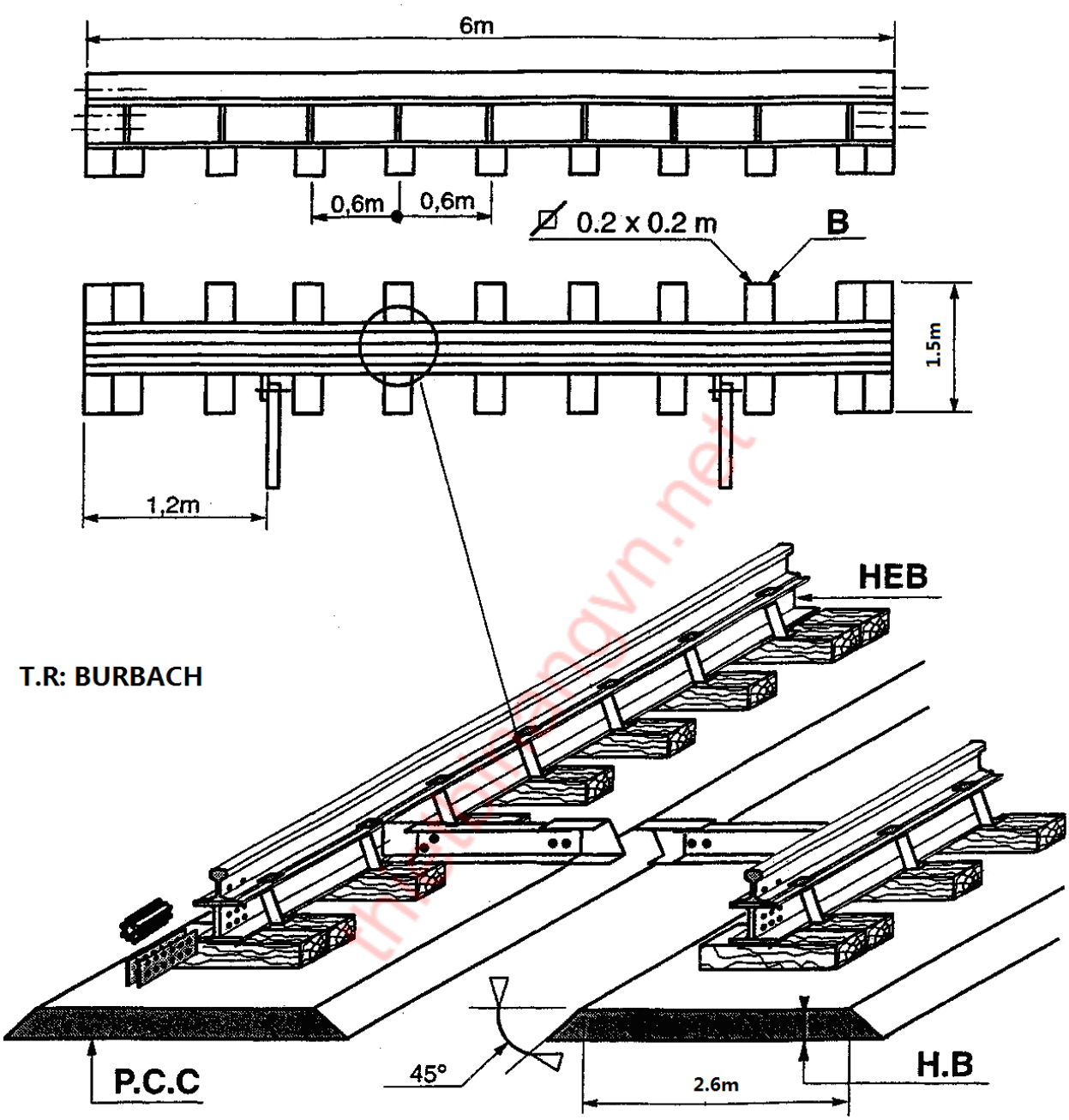


R	H.E.B	H.B	P.R
130t	400	400	54
120t	400	350	54
110t	400	300	54

图 2-16 木枕上的轨道反力 130t~150t Fig. 2-16 The Rail On The Wooden Sleeper Reactions130t~150t

d.木枕上的轨道反力 230t

The Rail On The Wooden Sleeper Reactions 230t



R	H.E.B	H.B	P.R
230t	450	550	50

图 2-17 木枕上的轨道反力 230t Fig. 2-17 The Rail On The Wooden Sleeper Reactions 230t

2.2.6 轨道停止器 Rail Stops

接近轨道终点的塔机必须在触及轨道停止器之前停止行走运动。

We remind you that the crane when approaching the track end must be stopped before hitting the safety devices which are not working systems.

停止器的安装位置见图 2-18，它包括：

The three safety devices are fitted as indicated in the Fig.2-18. They consist of:

a.两个行走限位开关撞块(a);

Two traveling limit switchs (a);

b.四个焊固在钢轨上的挡块(b);

Four fixed stop welded on the rail (b);

c.四个焊固在钢轨上的挡板(c);

Four fixed stop plates on the rail (c);

d.四个锚固支座(d);

Four anchor seat(d);

上述停止器用户应特别认真地设计和装配，并定期检查以确保其正常使用。

The above devices are prescribed by the safety authorities and must be designed and fitted with particular care. Periodically make sure that they are working correctly.

检查撞块 a 是否与轨道平行，以防止行走限位开关滚轮离开撞块。

Check that the ramp (a) is parallel to the rail so that the limit switch roller does not leave the ramp.

用户自备停止器组件(a),(b),(c),(d)并自行安装。

The supply and fixing of the devices (a), (b), (c) and (d) are the responsibility of the user.

注意:在轨道的每一端，应布置两个挡块，位置应调准，使其同时工作。

Note: There are two fixed stops on the per-end of a rail. Adjust their station and work in double harness.

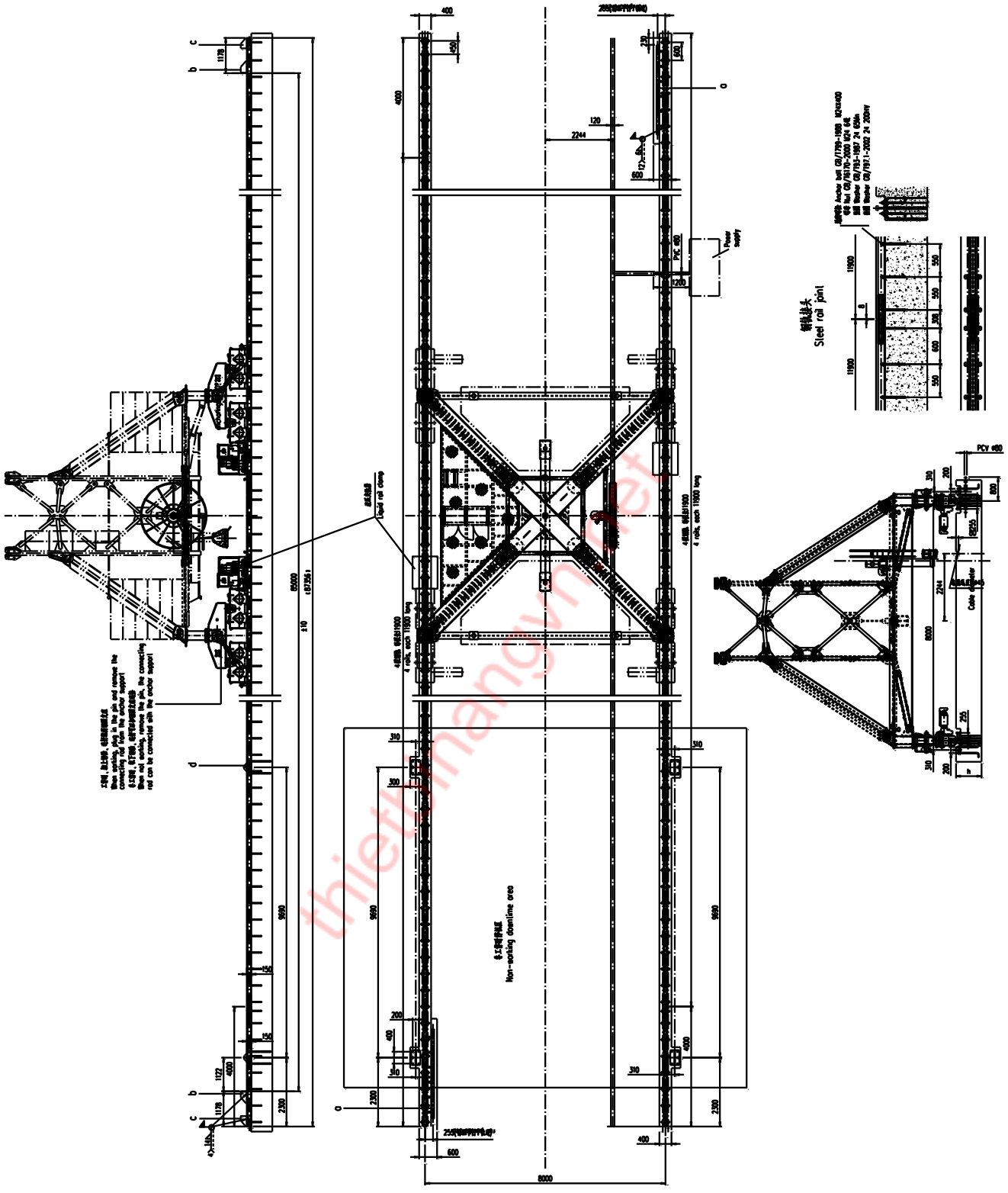


图 2-18 轨道停止器 Fig. 2-18 Rail Stops

2.3 压重 Base Ballast

2.3.1 引言 Introduction

压重由对称布置在底盘上的多个钢筋混凝土块组成。

The base ballast is made up of one or several reinforced concrete blocks which are placed symmetrically on the chassis.

压重必须按下面所给的图和表制作并安装。如果混凝土块中间有固定件穿过，应保证开口位置。混凝土块上下面应平行，否则会影响压重的稳定性并造成事故。

These blocks must be made and positioned on the chassis as shown in the figures and the corresponding table. Ensure the hatch position if there the fixing device thrill through the base ballast. The upper plane must parallel the lower plane otherwise effect the stability of ballasts and work accident.

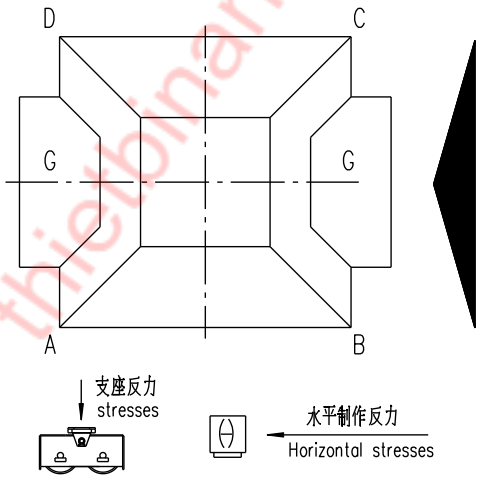
混凝土块在这里只作介绍，由用户自备，我们不提供。

The reinforcing of the concrete blocks, except the one shown in the figure. is left up to the customer who has also the responsibility for the ballast preparation. No supply from us.

注意：台车支座反力是按台车枢轴的受力给出的!

Note: The reaction acting on the bogie is given for a force passing through the bogie/fork hinge bolt.

2.3.2 压重表 Base Ballast Table



塔身节数量 The number of mast	吊钩高度 Hook height	压重层数 Number of layers	混凝土块数 Number of blocks	所需最小压重 Minimum ballast required	工作状态支座反力 Stresses in service	非工作状态支座反力 Stresses out of service	水平支座反力 Horizontal stresses
1	26.63m	6	12	72t			
2	32.41m						
3	38.19m						
4	43.97m						
5	49.75m						
6	55.53m				90.4t	109.3t	7.14t

图 2-19 压重 Fig. 2-19 Base ballast

2.3.3 压重构造 ballast Block Details

说明与符号 Explanation and symbols

举例：4HAΦ20×565 e:19　Example:4HAΦ20×565 e:19

表 2-4　Table 2-4

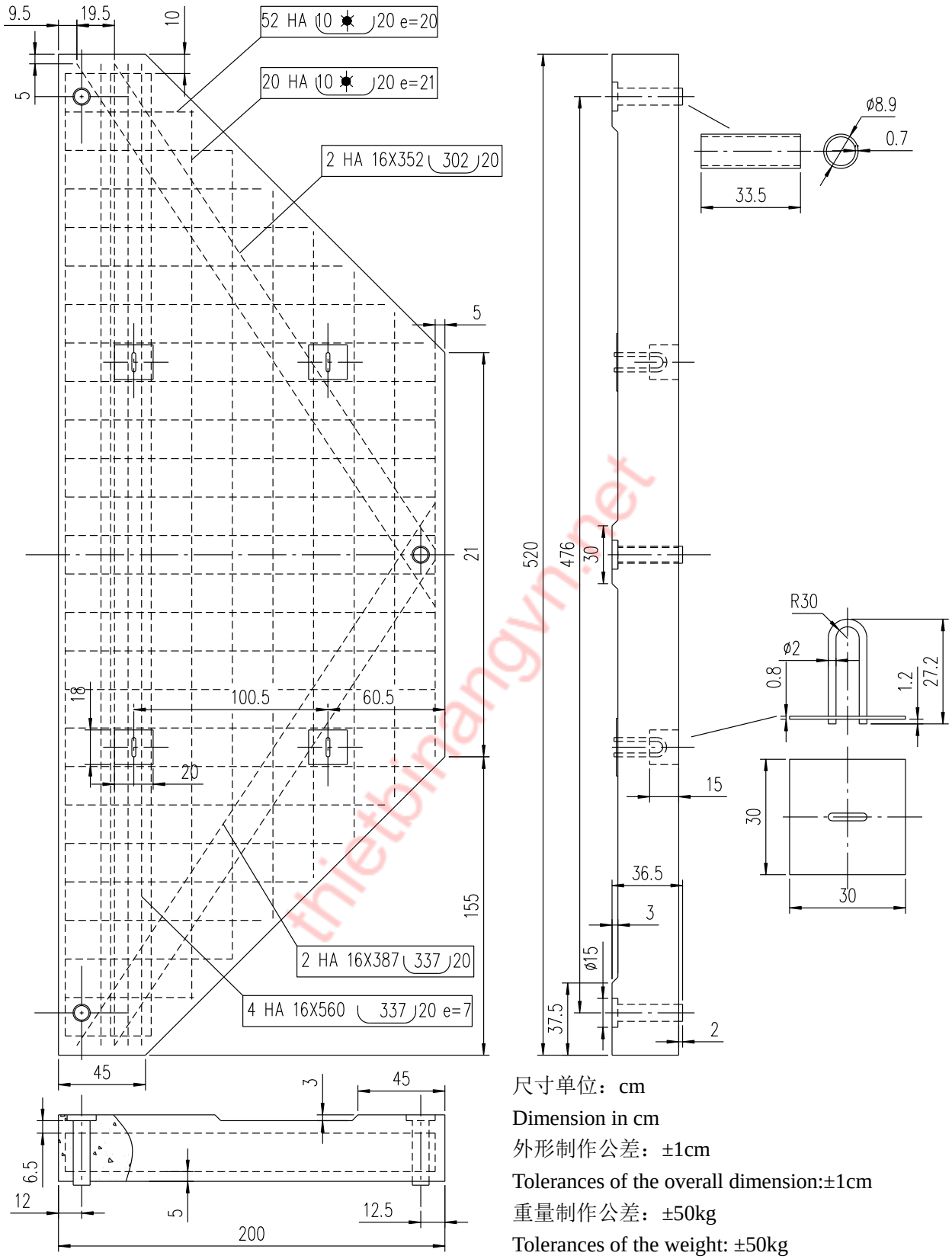
符号 Symbols	说明 Explanation	符号 Symbols	说明 Explanation
4	钢筋数量 number of bars	HA	高强度钢筋 Round steel with high adherence
Φ12	钢筋直径 (mm) diameter of iron in mm	565	钢筋长度(cm) Unit length of iron in cm
e	间距(cm) pacing between bars or pins in cm		

水泥最大含量为 350kg/m^3。水泥质量:525 或类似标号。

Concrete mixed for 350kg/m^3. Quality of cement: 525# or equivalent.

混凝土密度为 2.4t/ m^3。

The density of the concrete is 2.4t/ m^3.



尺寸单位：cm

Dimension in cm

外形制作公差：±1cm

Tolerances of the overall dimension:±1cm

重量制作公差：±50kg

Tolerances of the weight: ±50kg

注意：一个压重块的总长是 520cm 重量是 6000kg

Note: To position-Total length for one ballast block 520cm，Weight 6000kg.

图 2-20 压重 Fig. 2-20 Base ballast

2.4 配重 Counter-jib ballast

2.4.1 引言 Introduction

配重由几个混凝土块(A、B)组成，用它们进行组合可以得到与臂长相一致的各种重量。这些混凝土一块一块地吊挂在平衡臂尾部。混凝土的制作由用户负责。

The counter-jib ballast is made up of several A B. blocks in reinforced concrete. Their combination allows to obtain the various weights corresponding to each jib length used. These blocks are suspended, one by one, under the counter-jib nose.The block's reinforcement as well as the device used to lift and to suspend the blocks on the counter-jib is to be determined and to be prepared by the user in such a way that the blocks do not chip off or get loose when handing them or operating the crane.

以下几页给出了混凝土块提升和吊挂装置的具体结构和尺寸。

The following pages given the constructional and functional dimensions required to install the lifting and suspension device.

为了得到每块混凝土块的要求重量(允许±10kg)，可改变尺寸 X(见表)。

To obtain the required weight with + or – 10kg per block, vary the dimension X as a function of the density of the aggregate used (see table).

建议称出每块的质量并标识在每块的侧壁上。

We recommend to weight the blocks and to mark the weight with paint on one of their sides.

注意：起升机构为 122LVF40NB 时用本配重。

Note:When the hoisting mechanism is 122LVF40NB use this counter-jib ballast.

2.4.2 配重表 Counter-jib Ballast Table

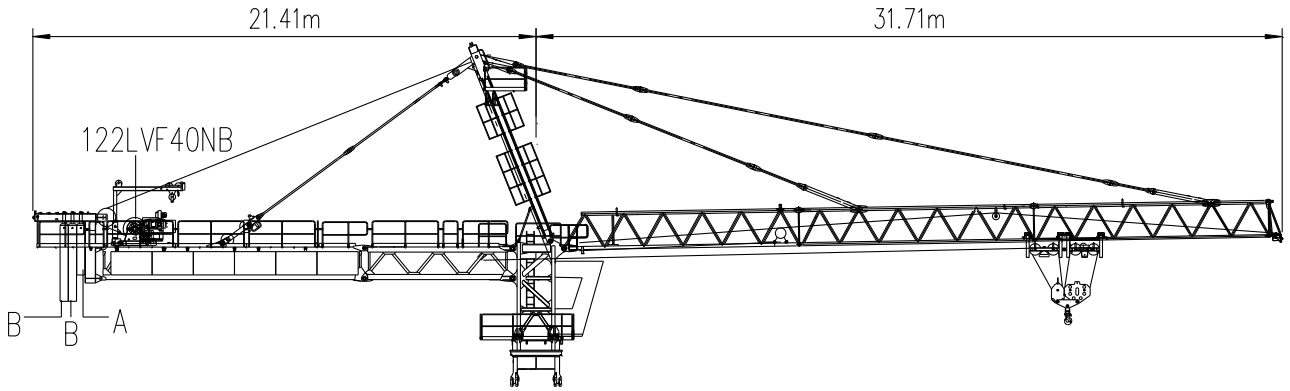


图 2-21 配重 Fig. 2-21 Counter-jib ballast

A=1700±50kg，B=3800±50kg

1A+2B=9300kg

配重侧面需加重量标识 1700kg、3800kg。

Counter-jib need to aggravate to measure The marking 1700kg、3800kg。

尺寸以厘米为单位 Dimensions in cm.

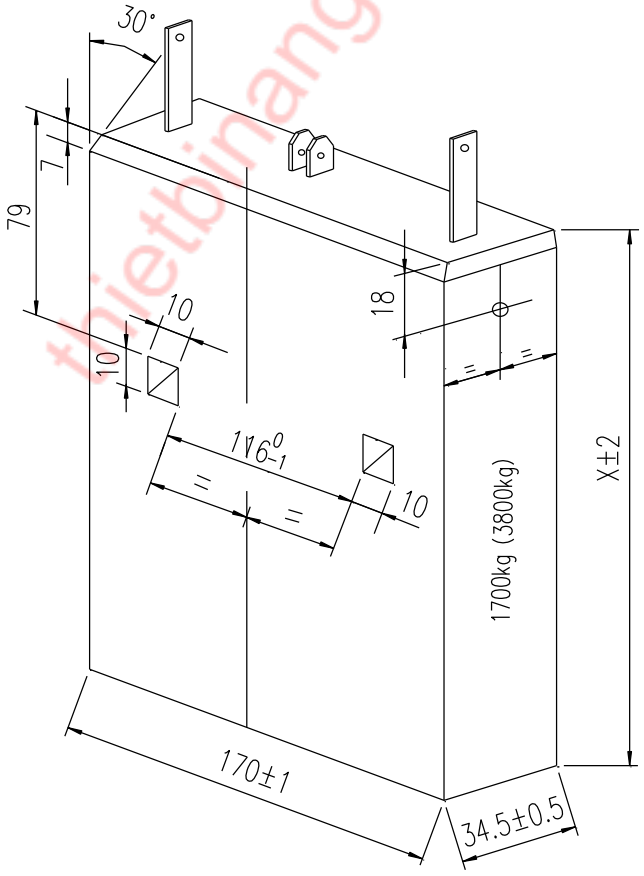
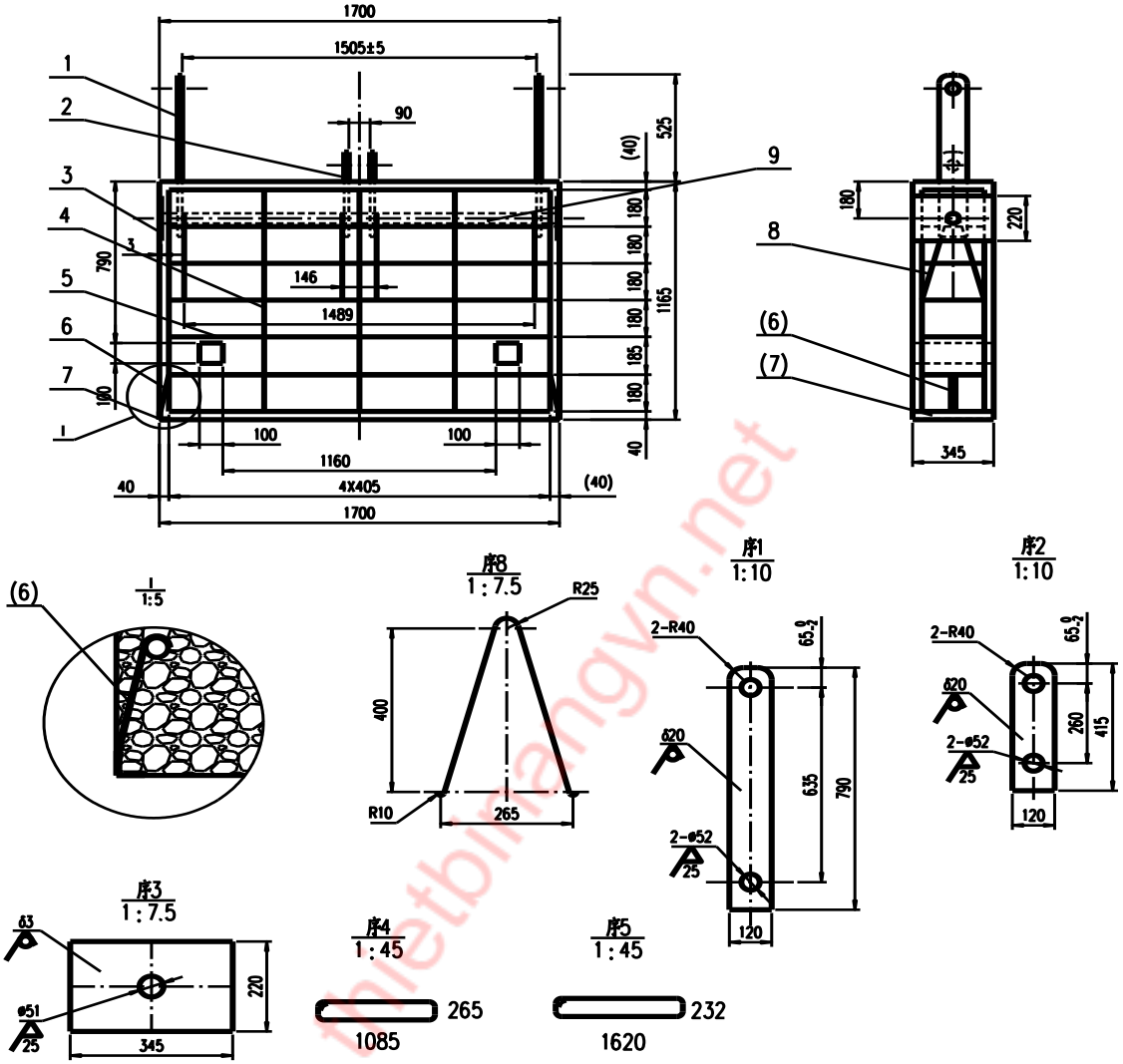


图 2-22 配重 Fig. 2-22 Counter-jib ballast

2.4.3 配重设计 Counter-jib ballast plan

①.配重块 A Counter-jib ballast A

重量 Weight 1700±50kg 密度 Density：2.45t/m^3 尺寸 Dimensions: mm

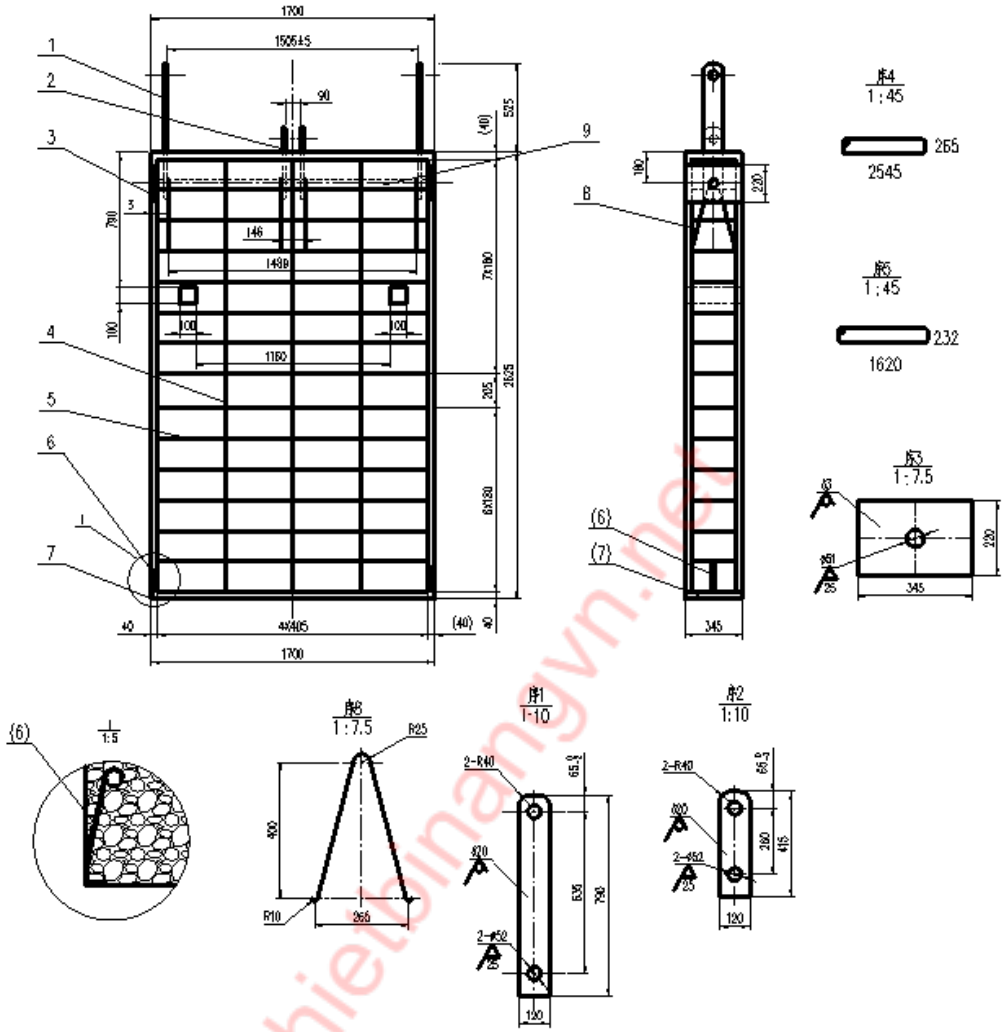


序号 Serial Number	名称 Name	数量 Number
1	钢板 Plate -20×120×790	2
2	钢板 Plate -20×120×415	2
3	孔板 Plate -3×220×345	2
4	钢筋 Steel rod φ16×2700	5
5	钢筋 Steel rod φ16×3704	7
6	钢板 Plate -2×20×200	2
7	角钢 Steel angle L40×4×345	2
8	钢筋 Steel rod φ16	4
9	圆钢 Steel rod φ50×1700	1

图 2-23 配重 A Fig. 2-23 Counter-jib ballast A

②.配重块 B Counter-jib ballast B

重量 Weight 3800±50kg 密度 Density：2.45t/m^3 尺寸 Dimensions: mm



序号 Serial Number	名称 Name	数量 Number
1	钢板 Plate -20×120×790	2
2	钢板 Plate -20×120×415	2
3	孔板 Plate -3×220×345	2
4	钢筋 Steel rod φ16×5620	5
5	钢筋 Steel rod φ16×3704	15
6	钢板 Plate -2×20×200	2
7	角钢 Steel angle L40×4×345	2
8	钢筋 Steel rod φ16	4
9	圆钢 Steel rod φ50×1700	1

图 2-24 配重 B Fig. 2-24 Counter-jib ballast B

3.用汽车吊安装塔机说明--塔机主要部件重量

Characteristics Of The Lorry Mounted Crane–Weight Of The Main Components

3.1 说明 Introduction

下表中所列重量、幅度、高度在计算时已考虑到下列因素的各种可能性:

The weight, radii, height in the tables of the following page 2 have been calculated considering the different possibilities as to:

a.工地条件

The site condition

b.能合适的汽车吊。

The mobile crane available

对于一台塔机来说，其示意图表示需起吊的主要部件及其附带的机构连接附件，如轴销或螺栓等(底盘除外)。

For each crane, the sketch shown represents the component to be lifted with all its equipments and connecting accessories such as shafts or bolts (except for the chassis).

下面几页给出：

The following pages give:

a.塔机所需的场地，

The space requirements of the crane.

注意：尺寸表示在无载荷或有载荷情况下不考虑变形的理论尺寸。

ATTENTION: The dimensions indicated are theoretical dimensions which do not account for deformations when without or under load.

b.现场塔机主要部件的重量和尺寸由此可以按顺序进行部件安装后吊装。

The weights and dimensions of the main crane parts in the way that they can be handled on site in order to constitute complete packages which are to be lifted.

3.2 重量和高度 Weights And Hook Heights

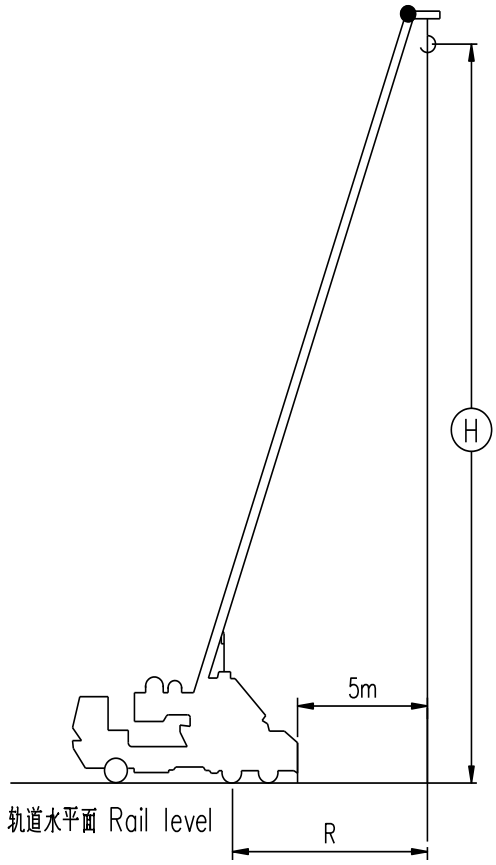


图 3-1 汽车吊

Fig. 3-1 Lorry Mounted Crane

表 3-1 Table 3-1

c	R	h (m)	H (m)	W±5% (kg)
1	10m/min	0.65	1.2	f 4×1430
				m 4×1720
2		7.9	9.2	26353
3			10.2	4640
4		14.1	20.1	7212
5			13.9	290
6			20	5500
7		14.1	19.1	2×410
8			17.7	7851
9			18.2	487
10		19	23.2	4700
11		19.5	23.2	11/1 3190
				11/2 4638
12		18.5	22.2	122LVF40NB 3872
13		27.5	30.7	2135
14		20.2	26.1	1700
		20.2	26.1	3800
15		18.95	24	11920
16				1000

表 3-1 给出塔机各部件的重量、高度、及安装后到地面的理论高度。

Tab.3-1 shows that the weight, height and after installation height to the ground theory of the tower crane parts.

f:从动台车 Trailing bogie m:主动台车 Motor bogie

C:部件号 Parcels R:半径 Radius

h:每个部件的理论高度 Thecretic height of the package once positioned

H:高度 Height W:重量 Weight

注 NOTE:

a.表 3-1 中所列吊装高度仅供参考，吊装时应以实物为准；

Listed in Table 3-1 hoisting height is for reference only when hoisting the object shall prevail.

b.吊装各部件时，应严格按照吊装相关作业标准进行，以确保安全。

When lifting parts .shall be carried out strictly in accordance with the relevant lifting operation standard,in order to ensure safety.

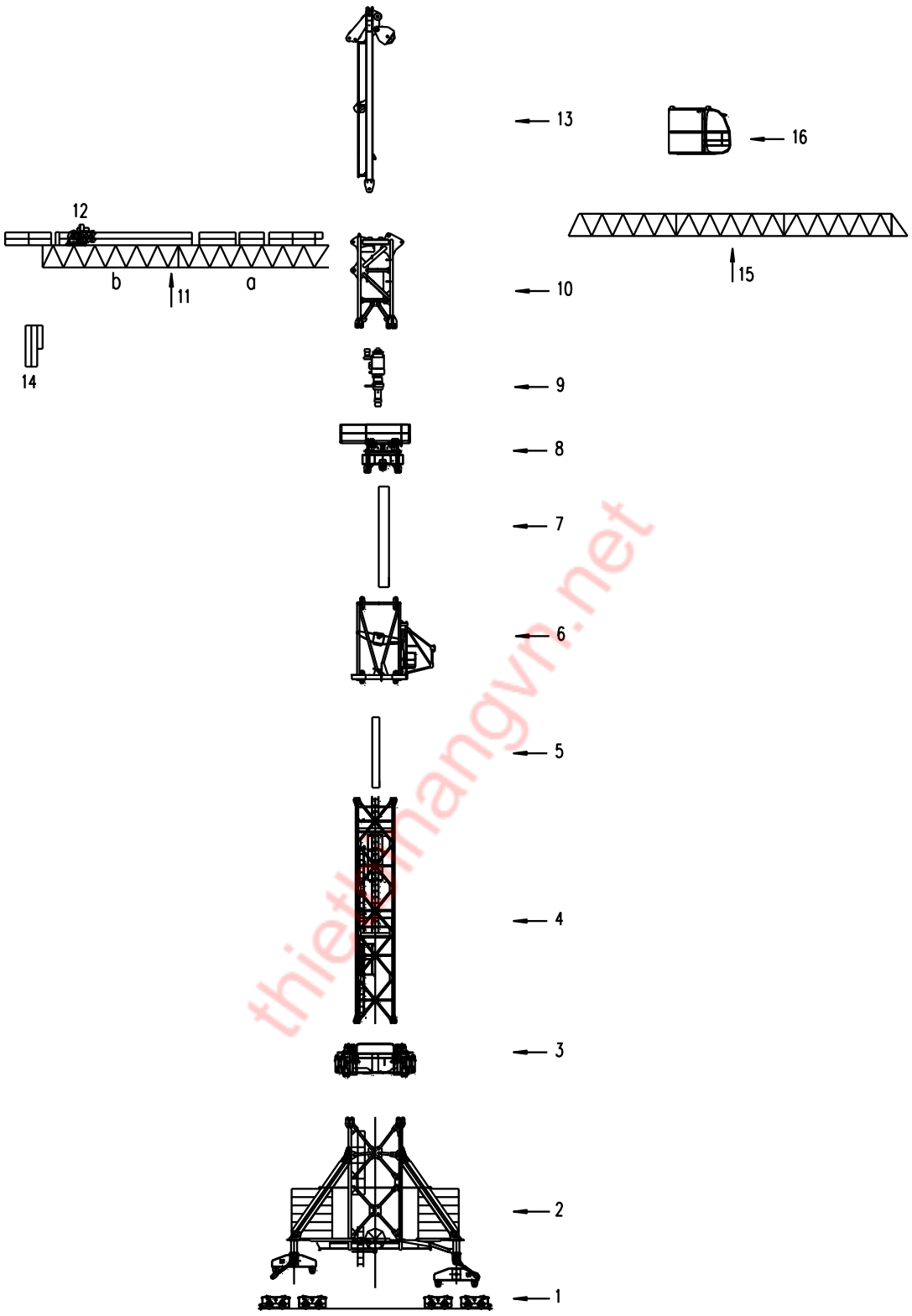
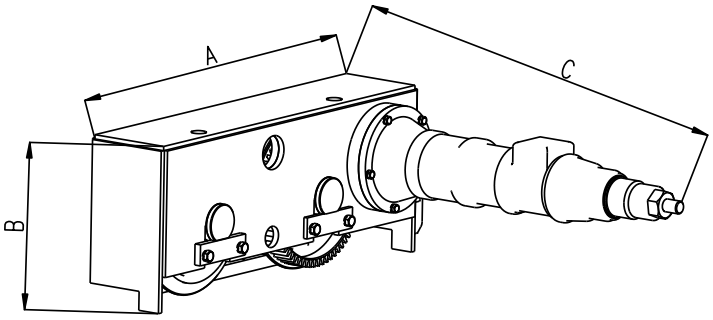


图 3-2 塔机主要部件 Fig 3-2 Main Crane Parts

3.3 行走机构 Traveling-Mechanism



台车一 MOTOR BOGIE 1

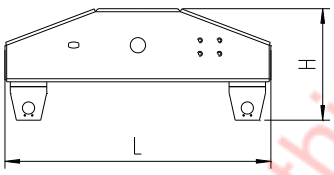
	外形 Size(cm)	重量 Weight(kg)
A	133	850
B	53	
C	120	

台车二 MOTOR BOGIE 2

	外形 Size(cm)	重量 Weight(kg)
A	133	850
B	53	
C	120	

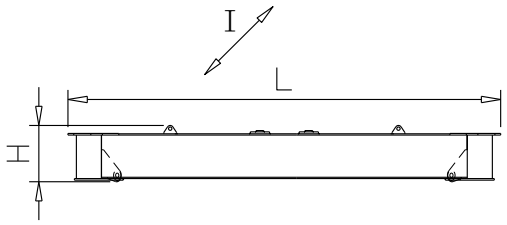
3.4 底盘 Chassis

1) 连接支座 Connecting seaty



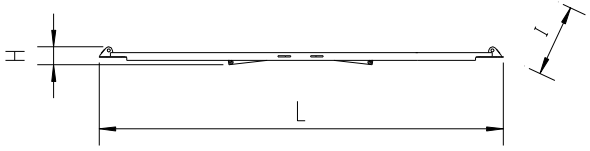
	外形 Size(cm)	重量 Weight(kg)
L	219	997
H	92	
I	94	

2) 横梁 Crossbeam



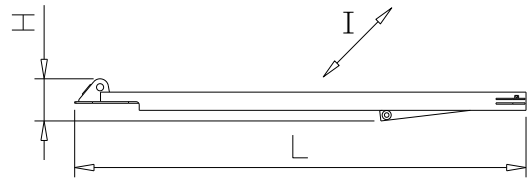
	外形 Size(cm)	重量 Weight(kg)
L	854	1388
H	70	
I	115	

3) 整梁 Whole bean



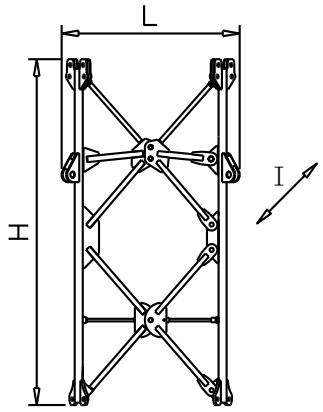
	外形 Size(cm)	重量 Weight(kg)
L	1187	1958
H	117	
I	60	

4) 半梁 Half beam



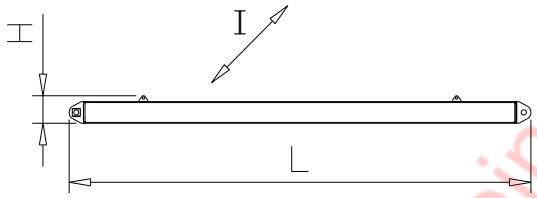
	外形 Size(cm)	重量 Weight(kg)
L	561.5	935
H	117	
I	60	

5) 底盘基础节 Chassis base mast



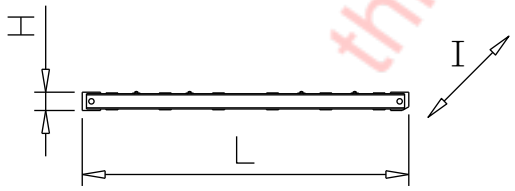
	外形 Size(cm)	重量 Weight(kg)
L	310	7466
H	600	
I	310	

6) 斜撑 Oblique legs



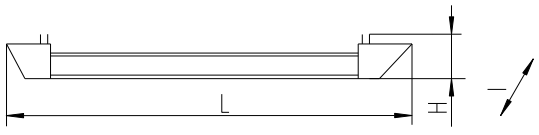
	外形 Size(cm)	重量 Weight(kg)
L	548	800
H	42	
I	37	

7) 撑杆 Stay bar



	外形 Size(cm)	重量 Weight(kg)
L	520	875
H	32	
I	30	

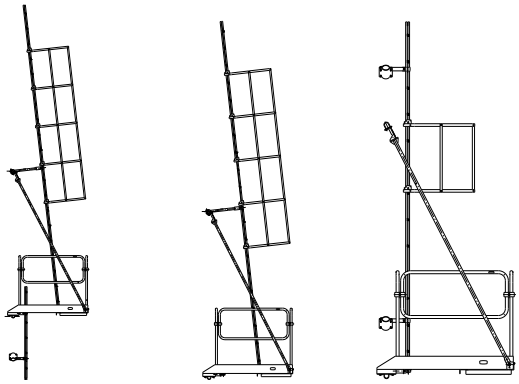
8) 压重支撑 Ballast support



	外形 Size(cm)	重量 Weight(kg)
L	503	836
H	48	
I	36	

3.5 通道-塔身-内塔身-滑动底座 Access-mast-inner mast-slider base

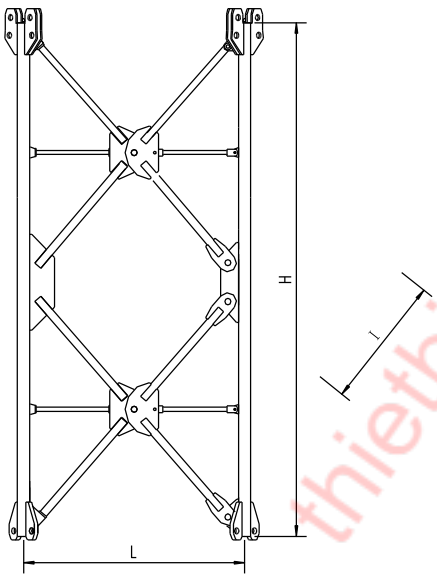
通道 Access



A **B** **C**

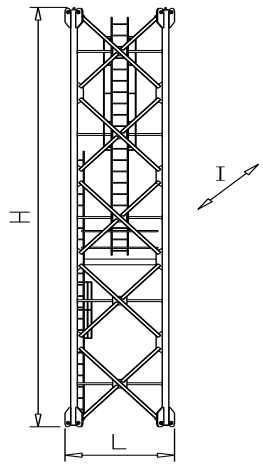
重量 Weight(kg)
A：195
B：177
C：179

塔身 Mast



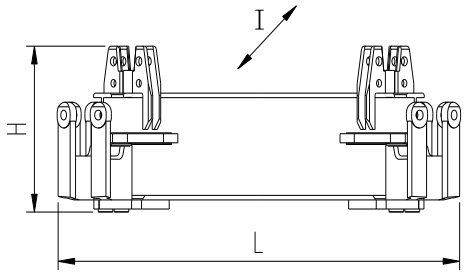
	外形 Size(cm)	重量 Weight(kg)
L	250	3969
H	600	
I	600	

内塔身 Inner mast



	外形 Size(cm)	重量 Weight(kg)
L	180	7212
H	1120	
I	180	

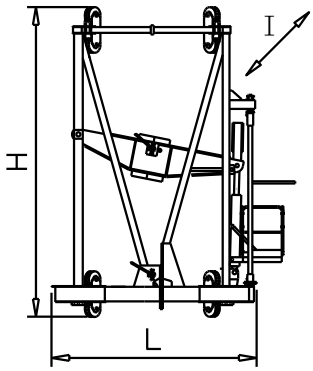
滑动底座 Slider base



	外形 Size(cm)	重量 Weight(kg)
L	252	4733
H	112	
I	252	

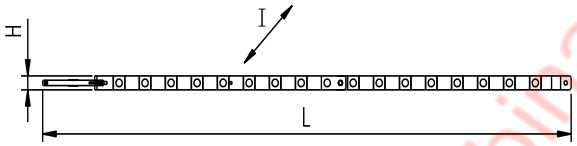
3.6 套架-爬升梯 Sleeve-upper Telescoping Ladder

套架 Sleeve



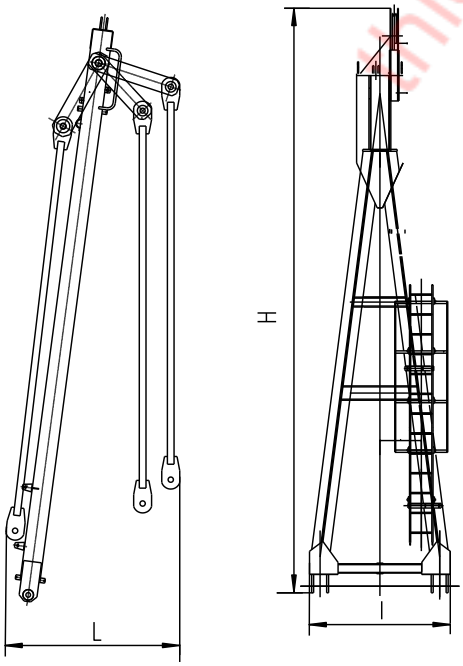
	外形 Size(cm)	重量 Weight(kg)
L	361	6021
H	250	
I	250	

爬升梯 Upper Telescoping Ladder



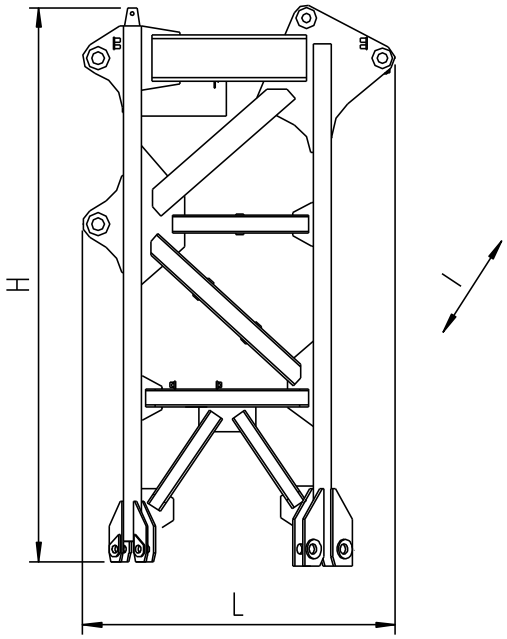
	外形 Size(cm)	重量 Weight(kg)
L	1174	406
H	23	
I	6	

3.7 塔头 Crane head



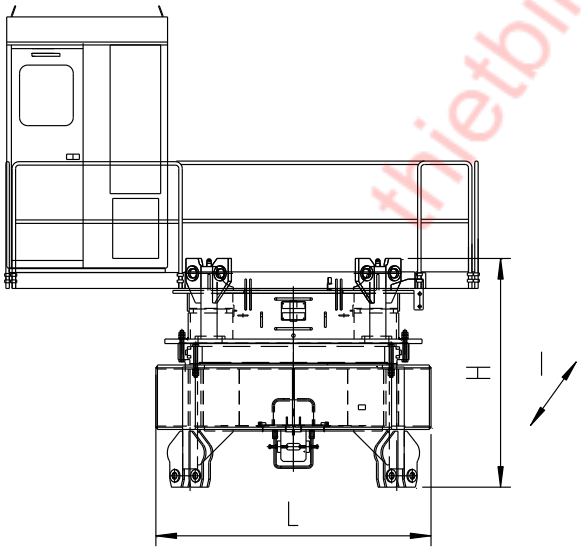
	外形 Size(cm)	重量 Weight(kg)
塔头 Tower head	L=160	3097
	H=928	
	I=140	
塔头结构 Tower head		2135
拉杆 Tie bar		962

3.8 驾驶室节 Pivot-mast



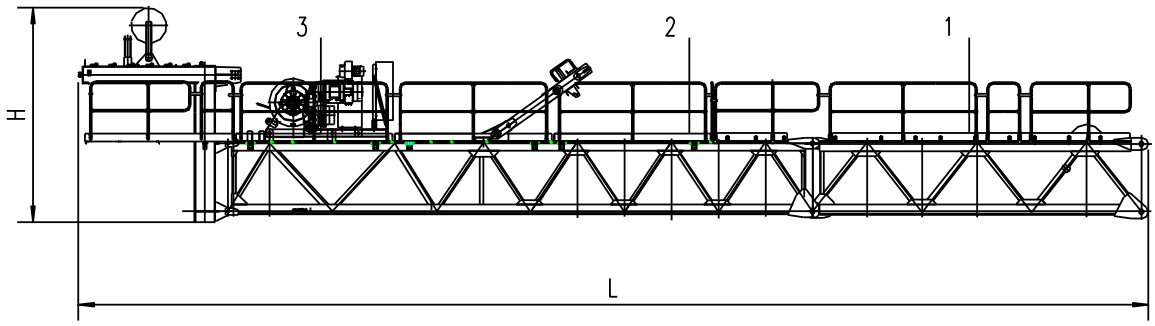
	外形 Size(cm)	重量 Weight(kg)
L	242	4700
H	430	
I	176	

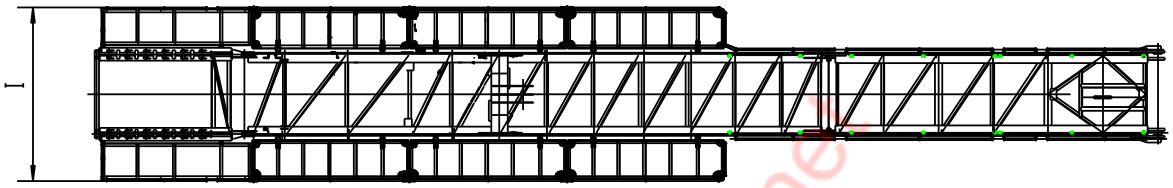
3.9 回转支承总成 Slewing support assembly



	外形 Size(cm)	重量 Weight(kg)
回转支承总成 Slewing support assembly		9338
回转支承 Slewing support	L=240 H=200 I=240	7163
平台栏杆 Platform and railing		688
回转机构 Slewing mechanism		487
驾驶室 Cab		1000

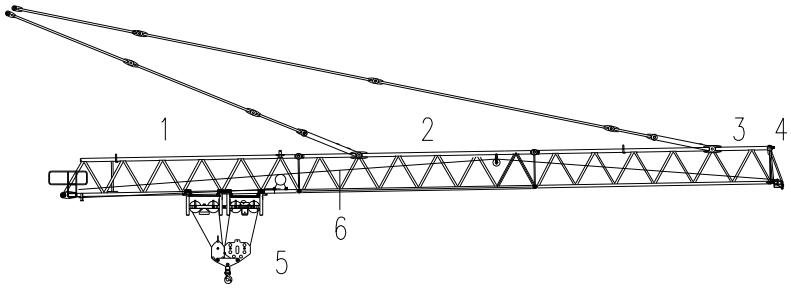
3.11 平衡臂 Counter-jib





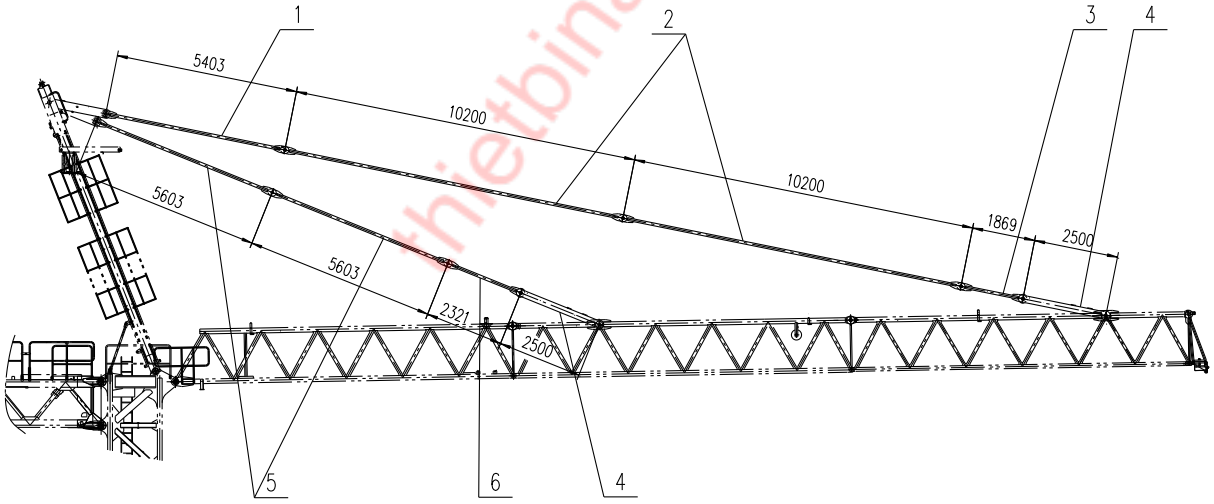
1			2			3	
根部节总成 Counter-jib foot	L（cm） H（cm） I（cm）	kg	端部节总成 Counter-jib nose	L（cm） H（cm） I（cm）	kg	起升机构 Hoist winch	kg
根部节总成 Counter-jib foot	657 260 175	3700	端部节总成 Counter-jib nose	1424 410 323	5657	起升机构 Hoist winch	2430
			端部节 Counter-jib nose	1140 205 199	4144		
			配重托架 Support	310 160 195	1489		

3.11 起重臂 Jib



		外形 Size(cm)			重量 Weight(kg)
	吊臂总成 Jib	L	H	I	
1	根部节总成(10m)Jib foot section	1074	205	160	2633
	根部节(10m) Jib foot section	1024	165	160	2462
	小车牵引机构 Mechanism				691
2	第二节总成(10m) Jib 2	1023	168	160	2359
	第二节(10m) Jib 2	1023	168	160	2172
3	第三节总成(10m) Jib section	1023	163	160	2045
	第三节(10m) Jib section	1023	163	160	1859
4	端部节总成 Jib end section	63	186	176	190
	端部节 Jib section	63	186	176	147
5	四倍率小车 Jib trolley	360	108	183	1297
6	钢丝绳 Rope				

3.12 起重臂拉杆 Tie bar



		数量 Amount	重量 Weight(kg)
	起重臂拉杆 Jib tie bar		3396
1	拉杆（一）Tie bar	1	259
2	拉杆（二）Tie bar	2	448.5
3	拉杆（三）Tie bar	1	111.3
4	2.5 米拉板 Steel plate（2.5m）	2	218.5
5	拉杆（五）Tie bar	2	267
6	拉杆（六）Tie bar	1	131

4.立塔 Erection Crane

4.1 安装程序 Erection Sequences

4.1.1 引言 Introduction

本安装程序可以最快速度将塔机安装到顶升位置。

This erection procedure allows to rapidly assemble your crane until it reaches its telescoping position.

安装时需要一辆辅助汽车吊。其起重特性必须适应起吊塔机部件的需要。

It requires an auxiliary mobile crane, the characteristics of which must correspond to the parts to be handled.

妥善安排安装和装配顺序，合理安排安装人员，恰当布置道路和安装场地，则能最大限度的减少辅助吊车的现场使用时间。

Reducing to a minimum time of the auxiliary crane used on sits involves a good coordination between the erection and assembling area.

顶升前的安装过程可不需要电力。

This erection procedure needs no electrical power up to the moment the telescoping sequence starts.

本章的目的是使用户熟悉总体安装操作方法。所涉及的部件及其详细装配见各有关章节。

The object of this brochure is to make you well acquainted with all the erection operations which are separately dealt with and detailed in small specialized brochures.

4.1.2 基本说明 General Fitting Instructions

注意 Very Important:

a.使用汽车吊安装塔机时必须注意安全。为此：

All the handling operations using the lorry mounted crane must be carried out safely. For this:

a).支牢汽车吊

Properly pack the crane

b).严禁超载

Do not overload the crane

c).吊具良好。按被吊物的重量选择正确的幅度。

Use slings in good order and of correct lengths according to the weights of parts to be lifted.

d).注意吊点位置

Respect the slinging points.

e).保证正确加楔

Ensure correct wedging.

b.安装作业必须按说明书顺序进行。

The erection operations must be carried out in accordance with the order listed.

c.必须安装并使用安全防护设施。如爬梯、平台、护栏、安全带等等。

Make sure that protections and safety means are fitted and used, such as: ladders, platforms, guard-rails, safety rope etc.

d.在安装平衡臂之前，塔头要旋转到正确方向(塔头侧面与塔身侧面平行)。

Before fitting the counter-jib, it is absolutely necessary that the tower head is correctly slewed (sides of the tower head parallel to the sides of the mast).

e.在滑动底座没有连接好以前，禁止以下操作：

If the slider base connection has not been carried out, it is forbidden to:

a).回转仅带一个配重的平衡臂

Slew the counter-jib alone with a ballast block;

b).回转臂架和带一个配重的平衡臂

Slew the jib and the counter-jib alone with a ballast block;

c).回转臂架和带全部配重的平衡臂

Slew the jib and the counter-jib alone with the entire ballast blocks;

注意：对特殊的安装情况，未安装配重的平衡臂可以转动。

However: For special fitting conditions, the counter-jib can be slewed without ballast.

f.下列事项未完成之前禁止起升操作：

All hoisting operations are absolutely forbidden before:

a).连接开关的安装

Installation of the connecting shutters;

b).放下平衡负荷；

Setting down the balancing load;

c).塔机检修期间；

Putting the crane into service

g.顶升时，没给出必要的指令时禁止起升塔身标准节。

The only exception is for hoisting the mast section in the conditions defined by the particular instructions for telescoping.

h.必须根据起重臂长度确定配重数量(见相应章节)。

It is essential that the amounts of counter-Jib ballast indicated according to the jib lengths are respected (see corresponding chapters).

i.平衡臂上未装配重时，严禁吊载。

It is absolutely forbidden to life a load if the counter-jib ballast is no fitted .

j.风速超过 60km/h 时，严禁顶升。

The crane must not be telescoping up with a wind exceeding 60 km/h.

k.塔机顶升过程中，严禁旋转起重臂、移动小车及升降吊钩。

It is forbidden to slew the jib, operate the jib trolley and use the load hook (hoisting-up or hoisting-down) as long as telescopic cage is lifted or being lifted.

l.本总则适用于

These instructions also apply to

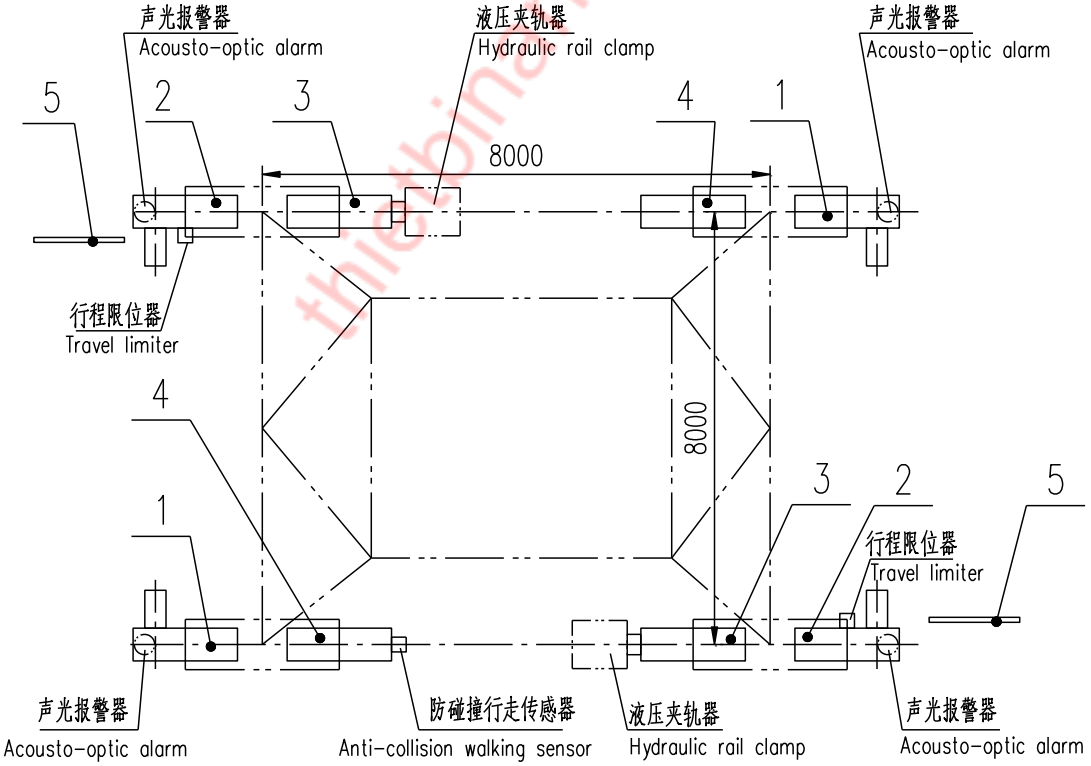
a).塔机安装 the erection **b).**塔机加节 the height increase **c).** 塔机拆卸 the dismantling

在安装过程中若遇特殊问题或其它困难，请立即与我公司用户服务部联系!

For any particular problem as the erection organization or other difficulty, please contact our After-Sales Service Team.

4.2 安装台车和横梁 Putting Bogies and Crossbeams

4.2.1 台车安装 Fit The Bogies



1—主动台车(1) Driving trolley(1) 2—主动台车(2) Driving trolley(2) 3—被动台车(1) Passive trolley(1)

4—被动台车(2) Passive trolley(2) 5—行程限位器楔块 Travel limiter diagonal block

图 4-1 台车安装 Fig. 4-1 Fitting the bogies

将台车安装在轨道上，台车放在轨道的合适地点。

Fit the bogies on the track, Ensure positioning of the bogies on the rails which is compatible with the space required for assembly.

如图 4-1 所示，台车放于轨道上并加楔

Place the bogies on the rails and wedge them in accordance with Figure 4-1.

安装夹轨器

Fit the rail ramps.

4.2.2 安装连接支座 Fitting the connecting support

连接支座上的螺栓孔用于安装电气元件，安装时将螺栓孔朝轨道外侧。

The bolt holes on the connection supports are used to install the electrical components. When installing the bolt holes, face the outside of the track.

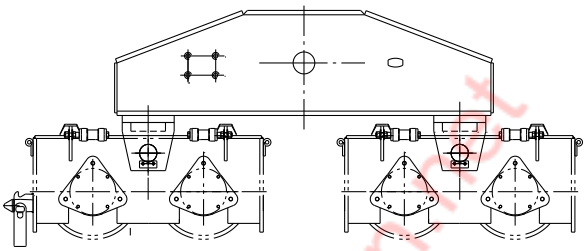


图 4-2 安装连接支座 Fig. 4-2 Fitting the connecting support

4.2.3 安装横梁 Fitting The Crossbeams

横梁与固定叉一起安装。

The crossbeams are equipped with fixed forks.

直轨的固定叉布置如图 4-3 所示。

For a straight track, the arrangements for the fixed forks are given in Figure4-3.

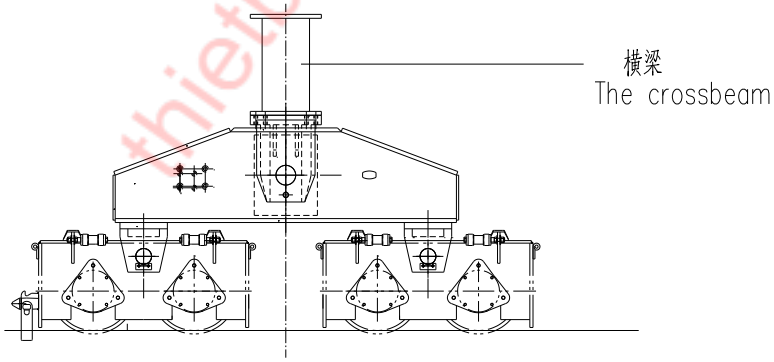


图 4-3 安装横梁 Fig. 4-3 Fitting The Crossbeams

4.3 安装 8m 底盘 Fitting The 8m Chassis

4.3.1 安装纵梁 Fitting The Side Member

在横梁(2、3)上安装纵梁(1)，并拧紧螺栓，见图 4-5.

Fit and bolt member (1) on the crossbeams (2,3). See Figure 4-5.

用同样的方法把半梁(4、5)安装在横梁上，并销紧在纵梁上。

The semi-side members (4, 5) are fitted on the crossbeams (2, 3) in the same way and pinned on the side member (1).

安装撑杆(6)。

Fitting the strut ties (6).

安装压重支撑杆(7)。

Mounting the ballast support (7).

按照图 4-5A 视图安装支柱(8)。

Fitting the prop (8) according to Fig.4-5A.

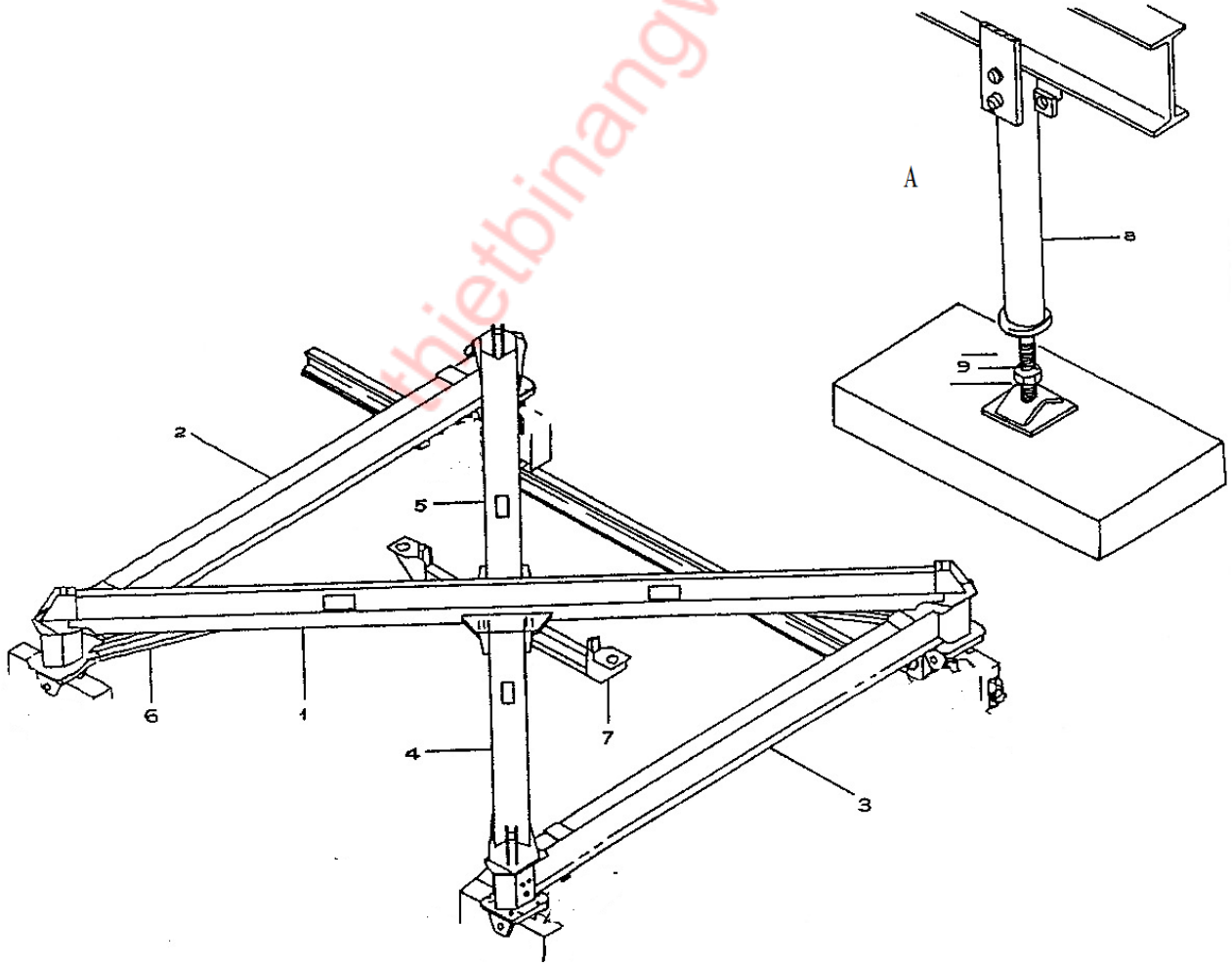


图 4-5 安装纵梁 Fig. 4-5 Fitting The Side Member

操作调节螺杆(9)以获得纵梁的完全水平。

Operate screw (9) in order to obtain prefect level of the side members.

4.3.2 安装底盘基础节 Fitting The Basic Mast Unit

在地上组装塔身节(1) ，见图 4-6。

Assembly mast section (1) on the ground, see Figure 4-6.

不要忘了连杆(2)。

Do not forget the links (2).

用螺栓把塔身(1)连接在纵梁上。

Bolt the mast section onto the side members.

把连杆销在压重支承杆上。

Pin the links on the ballast support.

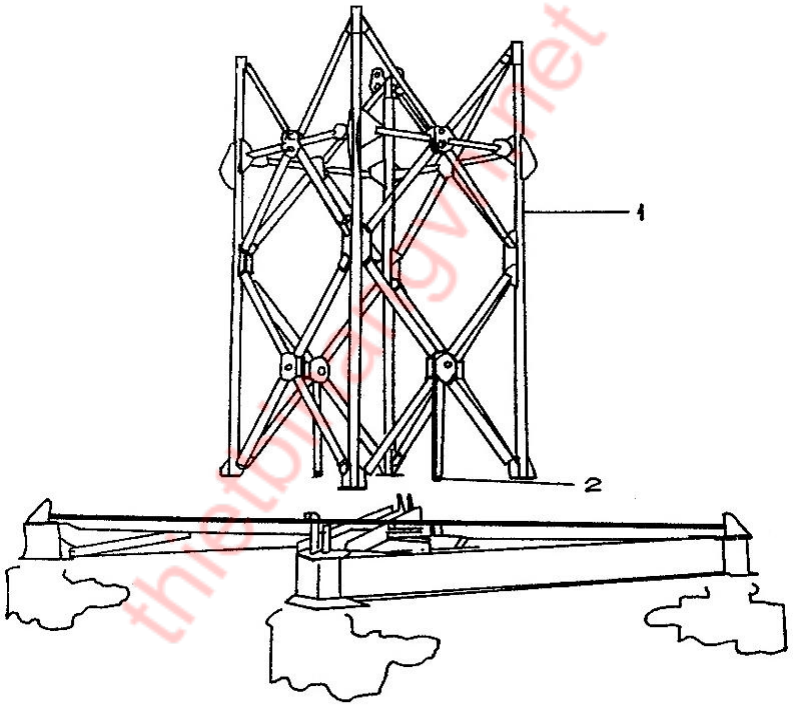


图 4-6 安装底盘基础节 Fig. 4-6 Fitting The Basic Mast Unit

安装斜撑，见图 4-7。

Fitting the oblique legs, see Figure 4-7.

注意：完成上述安装操作后，升高压重支承杆下的支柱是绝对重要的！

Important: After carrying out this fitting operation, it is absolutely essential to raise the prop under the ballast support.

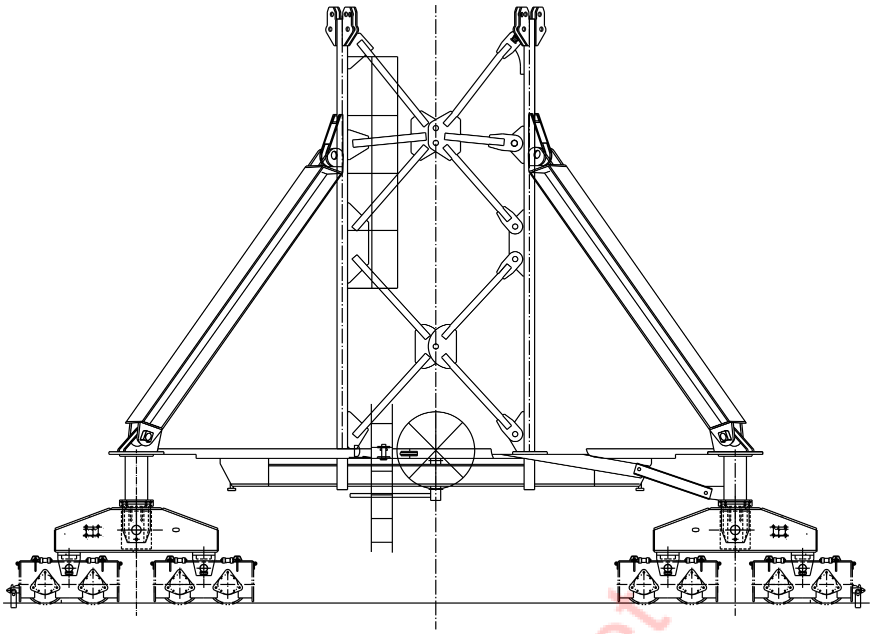


图 4-7 安装斜撑　Fig. 4-7 Fitting The Oblique Legs

4.3.3 安装底盘通道 Compete Chassis Access

主要构成如表 4-2：

The main elements are as the Tab. 4-2:

表 4-2　Table 4-2

代号 Symbols	1	2	3	4	5	6	7
部件 Component	梯子 Ladder	背圈 Back loop	梯子 Ladder	背圈 Back loop	平台 Platform	平台 Platform	附加管 Access tubes
数量 number	1	1	1	1	1	1	2

表 4-2 中所有代号如图 4-8 所示。

All the symbols in the Tab.4-2,as shown in Fig.4-8.

安装配置有折叠向上的背圈(2)的梯子(1)。

Fit the ladder(1), equipped with its back loop(2) which is foled upwards.

安装平台(5)、(6)，附加管(7)和梯子(3)。

Fit the platform (5), (6), access tubes (7) and ladder (3).

注意：只有在滑动底座通过后才能安装背圈(4)!

Note: The back loop (4) will only be fitted once the slider has passed.

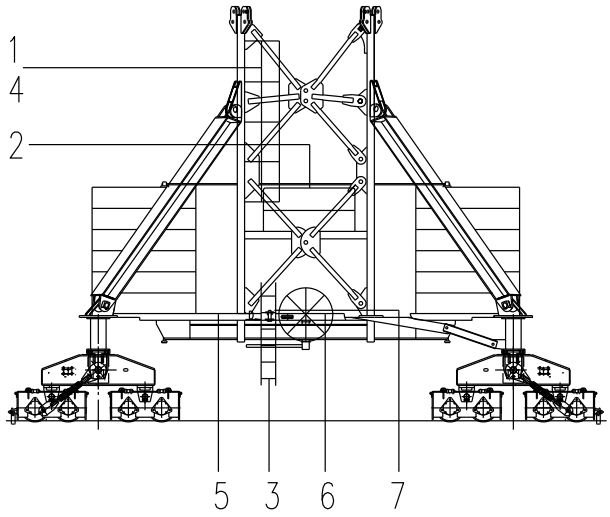


图 4-8 安装底盘通道 Fig. 4-8 Fitting Chassis Access

4.4 安装压重 Fitting the base ballast

底盘压重取决于塔机高度，见手册的构成图。

The chassis ballasting depends on the height of the crane, refer to brochure for its composition.

电缆卷筒并非由本机系统供应，其安装见使用说明书。

The cable winder is not systematically supplied with the machine, its fitting is described in the operating instructions.

固定压重，见图 4-9b。

Fixing the ballast，see Figure4-9b.

把固定杆(1)插入块内。

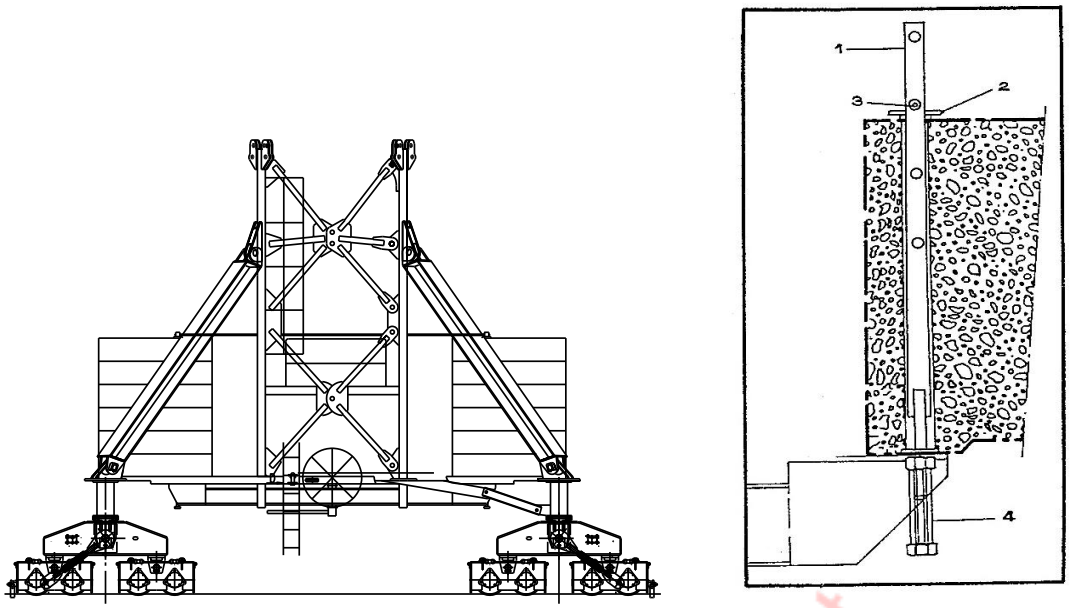
Introduce the fixing rod into the blocks(1)

放置板(2)并装上销轴(3)。

Place the plate(2) and fit the shaft(3)

靠螺母(4)使其连为一体。

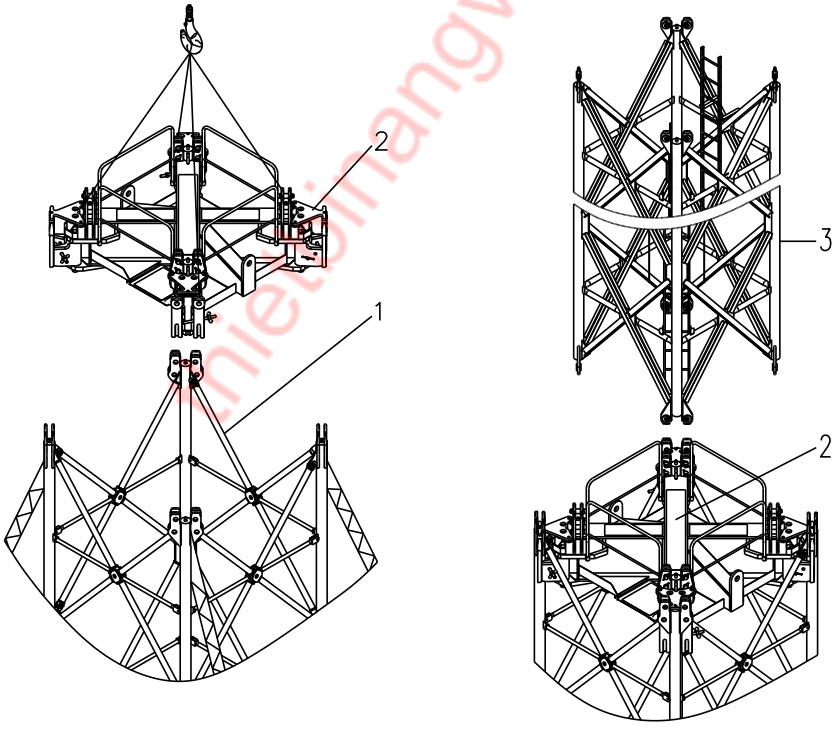
Block by means of a nut(4)



a b

图 4-9 安装压重 Fig. 4-9 Fitting The Base Ballast

4.5 安装滑动底座、内塔身 Fitting The Slider Base And Slider



a b

图 4-10 安装滑动底座、内塔身 Fig. 4-10 Fitting The Slider Base And Slider

把滑动底座(2)销紧在底盘基础节(1)上，见图 4-10a。

Pin the slider base (2) on the basic mast unit (1), see Figure 4-10a.

把内塔身(3)安装在滑动底座(2)上，见图 4-10b。

Fitting the slider (3) on the slider base (2), see Figure 4-10b.

安装下爬升梯。

Fit the under telescoping ladder

注意：确保滑动底座的活门面对底盘通道!

Note: Make sure that trapdoor of the slider base meet trapdoor of the chassis.

4.6 安装顶升套架 Fitting Telescopic Cage

用安全销完成顶升套架和底盘基础节的连接。

Carry out the chassis mast section connection by means of safety pins.

安装上爬升梯(2)。

Fit the upper telescoping ladder(2).

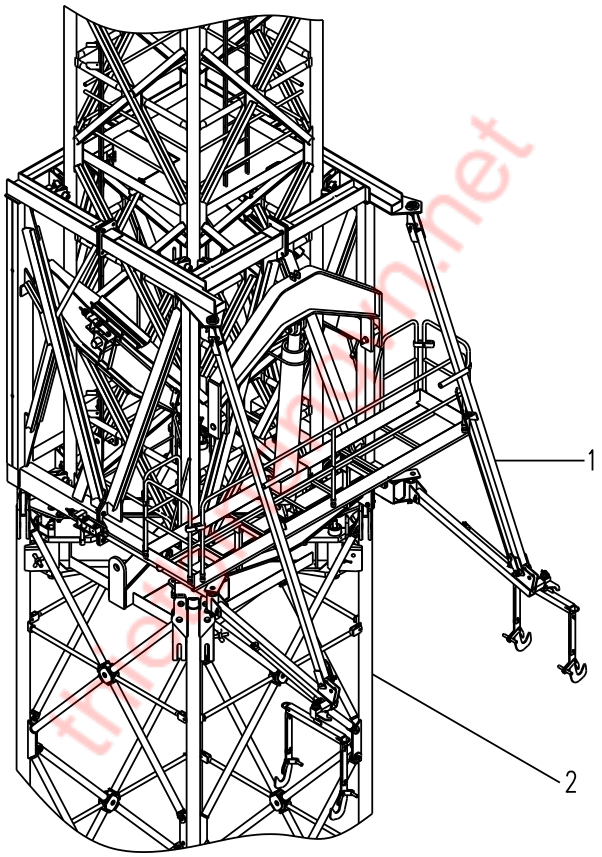


图 4-11 安装顶升套架 Fig. 4-11 Fitting Telescopic Cage

图 4-12 相对地表示爬升梯的装配。

Figure4-12 opposite shows the assembling of the telescoping ladder.

销轴的头部必须位于内塔身的外面。

The shaft head must be located on the slider side.

轴端盖是靠弹性圆柱销来定位的。

The shaft cover is immobilized by a straight pin.

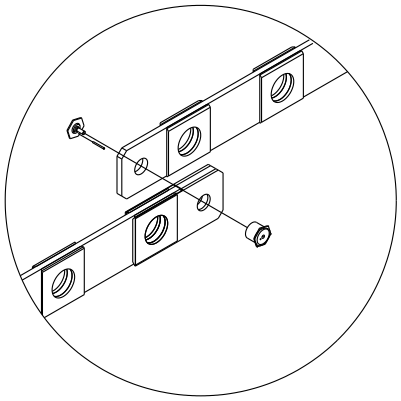


图 4-12 安装爬升梯 Fig. 4-12 Fitting telescoping ladder

4.7 安装回转支承组件 Fitting the slewing support assembly

回转支承组件包括：驾驶室、平台、栏杆、回转机构、回转支承。

The slewing support assembly comprises: cab, platform, handrail, slewing mechanism, slewing support.

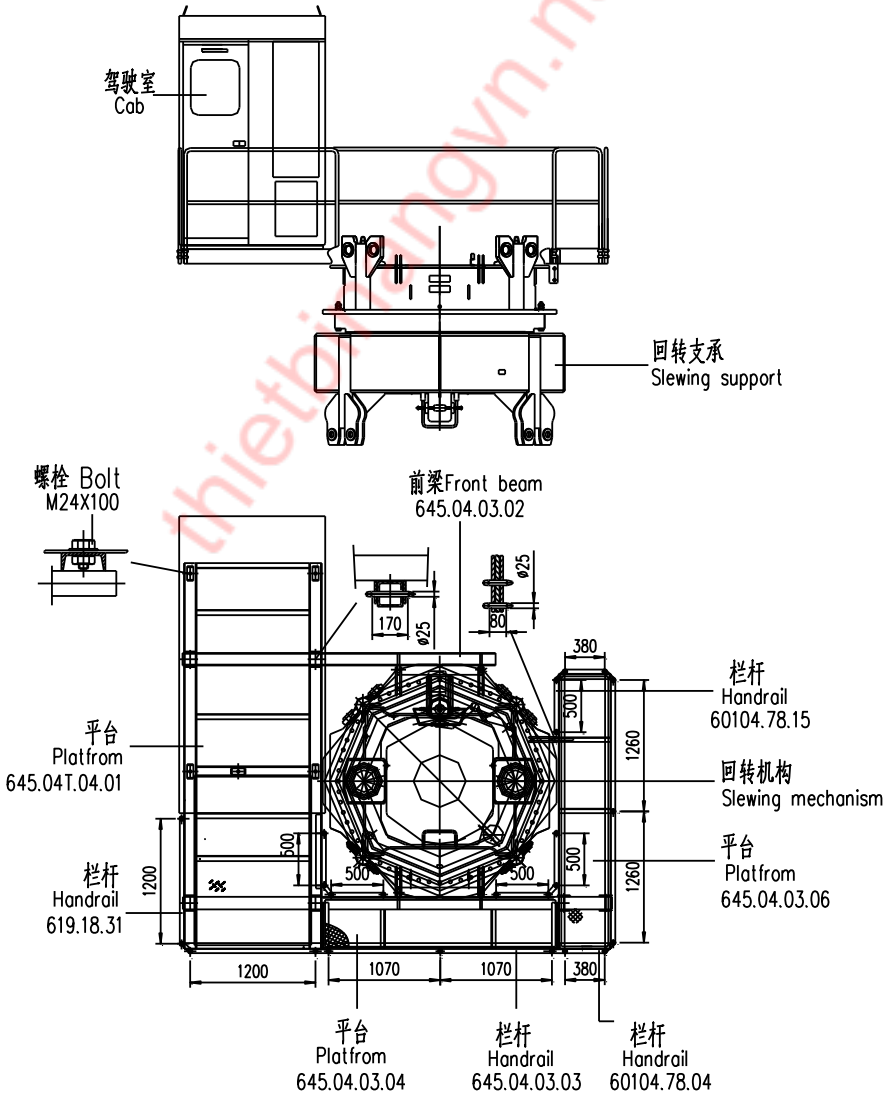


图 4-13 回转支承组件 Fig. 4-13 Slewing support assembly

下表给出了主要部件的重量，这些部件在运输或装卸时，可以拆卸。

The opposite table indicates the weight of the main parts which can be dismantled for transport or handling, if required.

名称 Name	重量 Weights（kg）
驾驶室 Cab	1000
回转支承 Slewing support	7163
平台+栏杆 Platfrom and handrail	688
回转机构 Slewing mechanism	487
总计 Total	9338

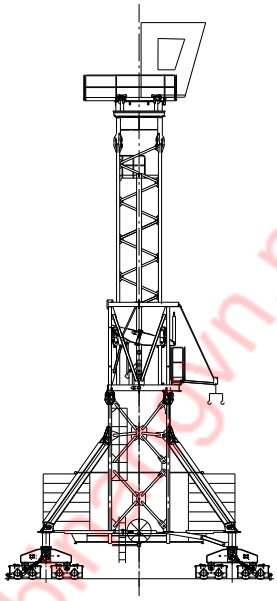


图 4-14 安装回转支承组件 Fig. 4-14 Fit the slewing support assembly

安装上爬升梯。

Fit the upper telescoping ladder

4.8 安装驾驶室节 Fitting the tower head cab mast

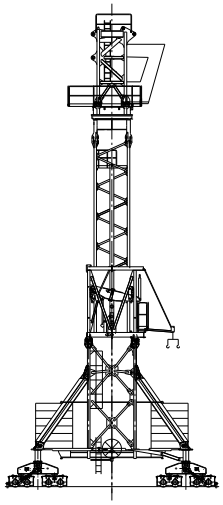


图 4-15 安装驾驶室节 Fig. 4-15 Fit the tower head cab mast

4.9 安装塔头 Fitting the tower head

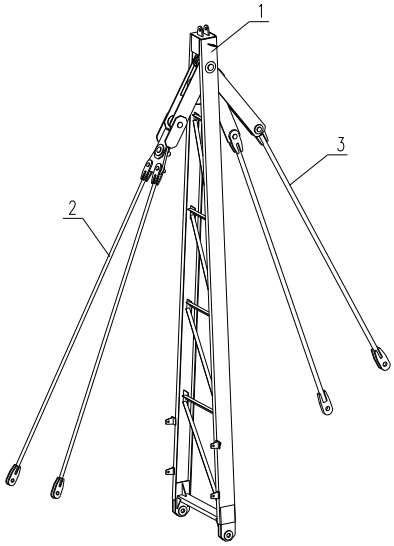
4.9.1 构造简介和重量 Description-weights

塔头组件包括：塔头(1)、平衡臂拉杆(2)两根、起重臂拉杆(3)两根。

The cat-head assembly comprises: A tower head (1), Two counter jib bars (2), Two jib bars (3).

下表列出了各主要部件的重量。在运输和搬运过程中可将塔头组件拆散。

The opposite table shows the weights of the main crane parts which can be dismantled for transport or handling.



序号 No.	数量 Quantity	重量 Weights
1	1	2500Kg
2	2	
3	2	

图 4-16 塔头 Fig. 4-16 Tower head

4.9.2 安装塔头 Fitting the tower head

将四米长的吊索(2)挂在塔头(1)上。提升至图示的位置。然后缓缓下落，使塔头支脚能对齐驾驶室节顶前耳座。装入轴销（3）并用开口销锁住。塔头向前倾斜到位时,即按如图所示用连杆(4)把塔头拉住。

Fit a 4m sling (2) around strut (1). Raise until the position is reached. Lower slightly in order to engage the strut feet into the cab-mast gussets. Pin shafts (3) of the strut and as it is inclined in the right position, pin-connect the retaining links (4) according to figure C.

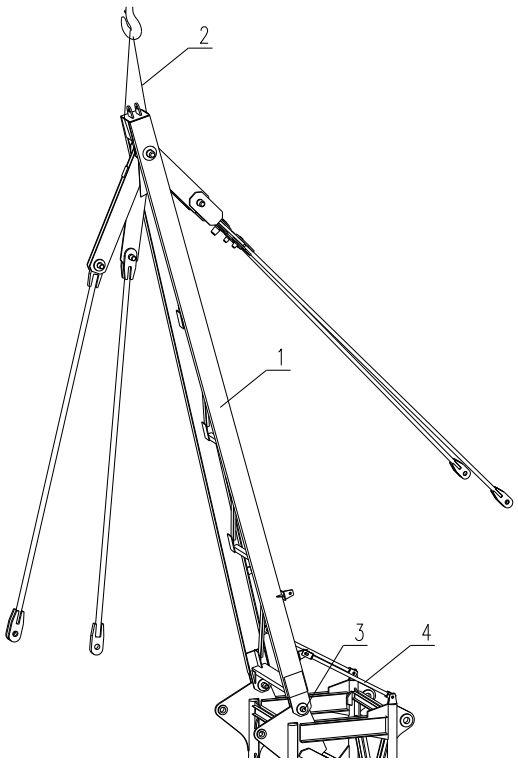


图 4-17 安装塔头 Fig. 4-17 Fitting tower head

4.10 装配起重臂及平衡臂 Assembling the jibs and counter-jibs

4.10.1 引言 Introduction

起重臂和平衡臂的安装依赖于安装人员对各主要部件的良好直观辨认。

The assembly of the jibs and counter-jibs depends on good visual identification of the main components.

以下各页详细给出了有关平衡臂和起重臂的长度，各种型钢、销轴尺寸及鱼尾板，拉杆长度等等。

The following pages give details about the lengths of the counter-jibs with respect to the jib lengths, the various profiles, pin dimensions or fishplate types, tie lengths, etc.

4.10.2 平衡臂的装配 Assembling the counter-jib

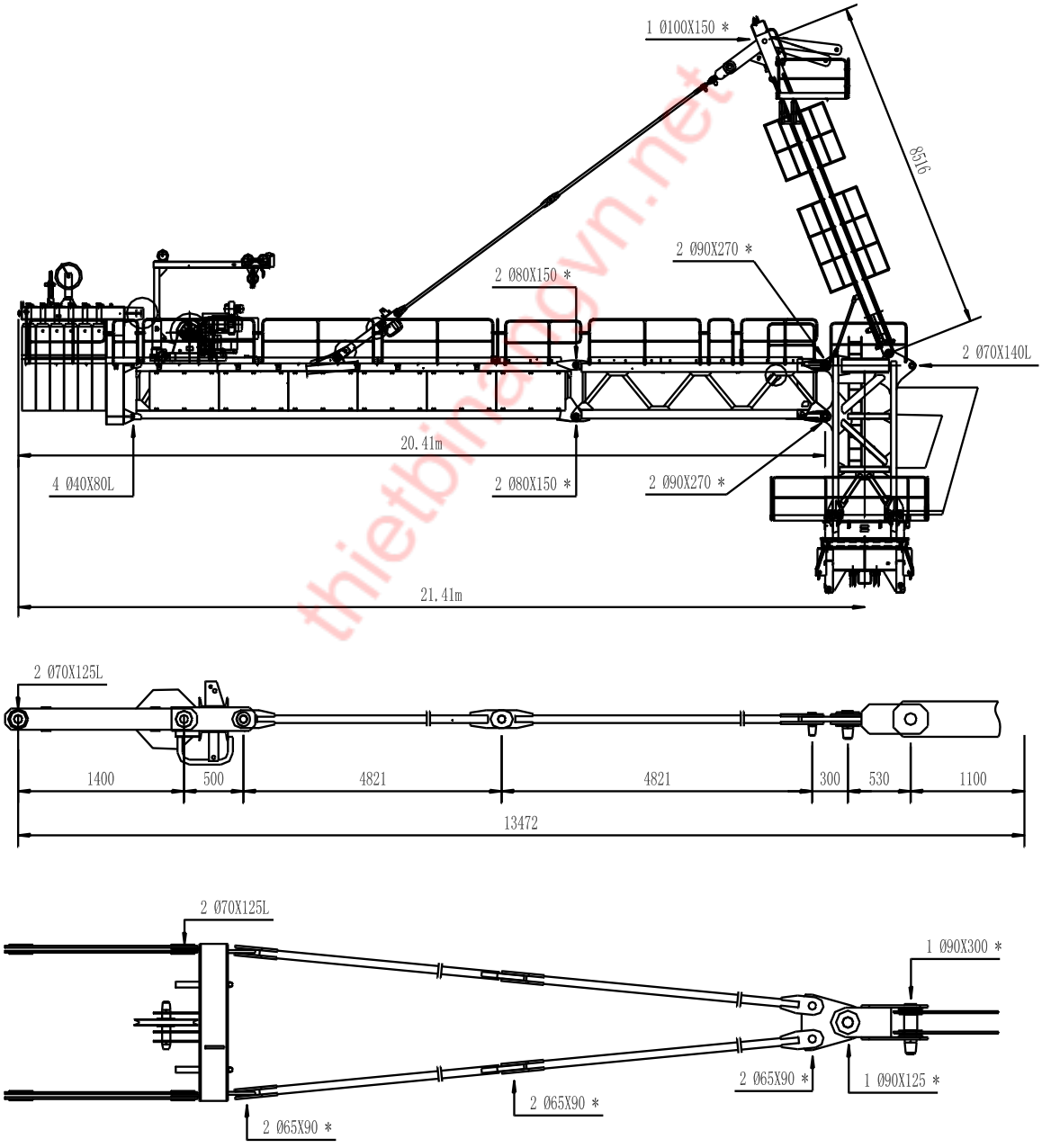


图 4-18 平衡臂的装配 Fig. 4-18 Assembling the counter-jib mast

4.10.3 风帆 Wind sail plates

平衡臂上不得安装风帆，使用者若安装任何标牌，请咨询我公司。

Wind sails plates must not be installed on the balance arm. Please consult our company if you install any labels.

起重臂上第二、第三节上安装风帆如下：

Install wind sail plates on the second and third sections of the jib as follows:

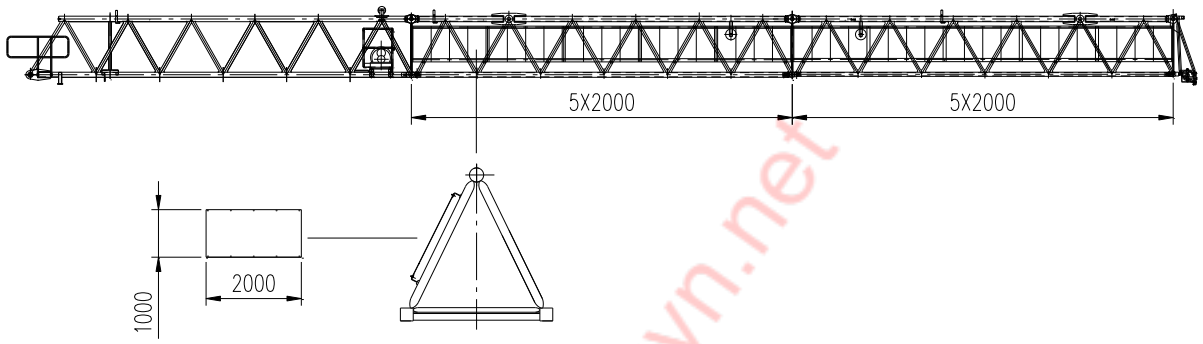


图 4-18 风帆 Fig. 4-19 Wind sail plates

用螺栓 M 6×25、螺母、垫圈固定风帆，以防止松动。

Fix the wind plate use the blots M6×25, nuts and washers so as to prevent any loosening.

4.10.4 起重臂的连接和拉杆的装配 Assembling the counter-jib and bar

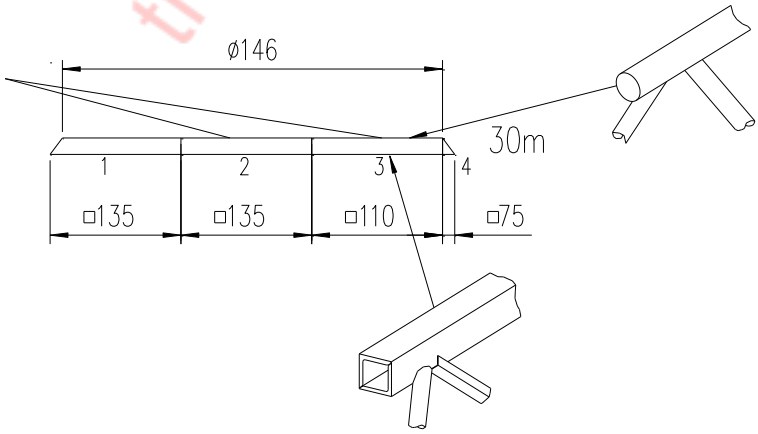


图 4-20 起重臂 Fig. 4-20 Jib

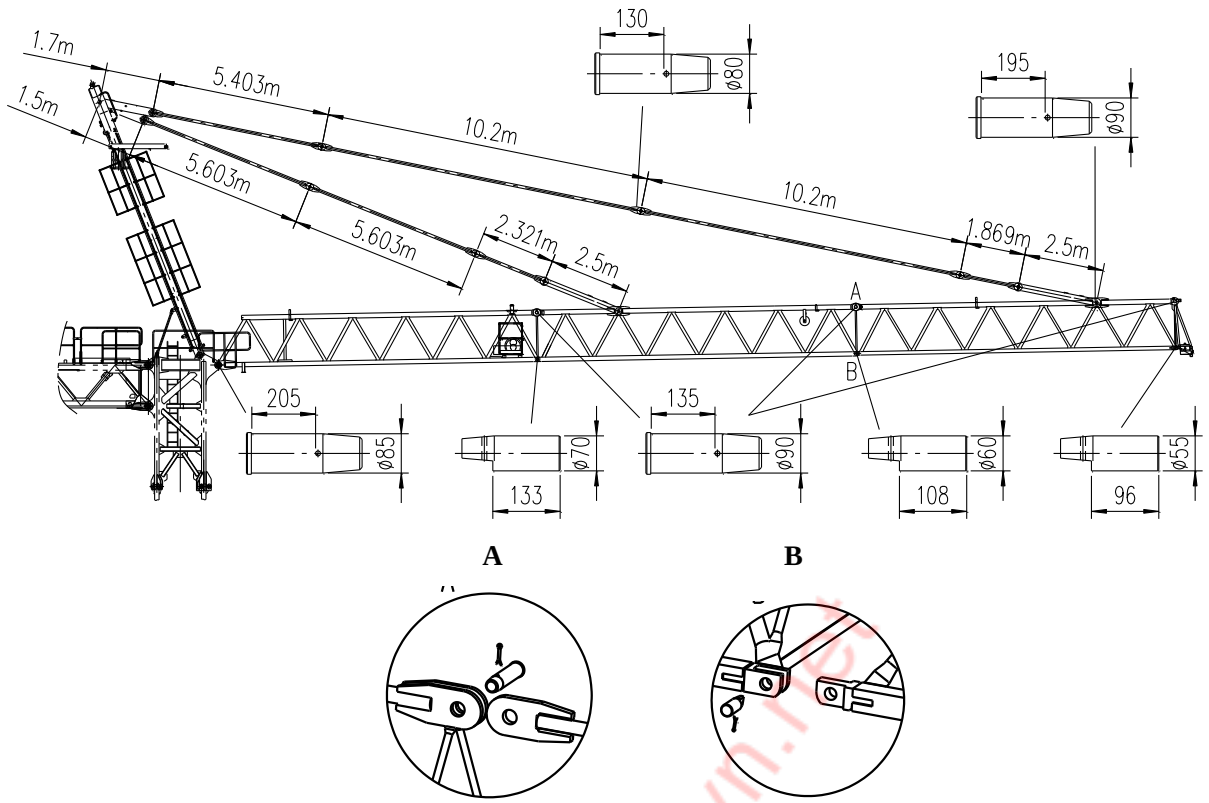


图 4-21 起重臂和拉杆 Fig. 4-21 Jib and bar

4.11 安装牵引小车和滑轮组 Fitting The Jib Trolley And Pulley Blocks

4.11.1 引言 Introduction

小车牵引装置包括:

The equipment of coupling trolleys winch includes:

a.一套安装在起重臂上的小车牵引机构。

A type trolley mechanism fitted in jib

b.一套钢丝绳(两根)

A set of 2 ropes (2 ropes).

4 绳吊钩为 4 绳工作，2 绳吊钩只允许 2 绳工作，它包括：

4 fall hook is only used at 4 fall work condition.2 fall hook is only used at 2 fall work condition:

表 4-3 Table 4-3

部件 Component	前小车(1) Front trolley	后小车(2) Rear trolley	前滑轮组(3) Front pulley block	后滑轮组(4) Rear pulley lock	扁担梁(5) Pulley block link	吊钩(6) Hook	检修护栏(7) Trolley platform
4 绳 4 fall	●	●	●	●	●	●	●
2 绳 2 fall	●		●		●	●	●

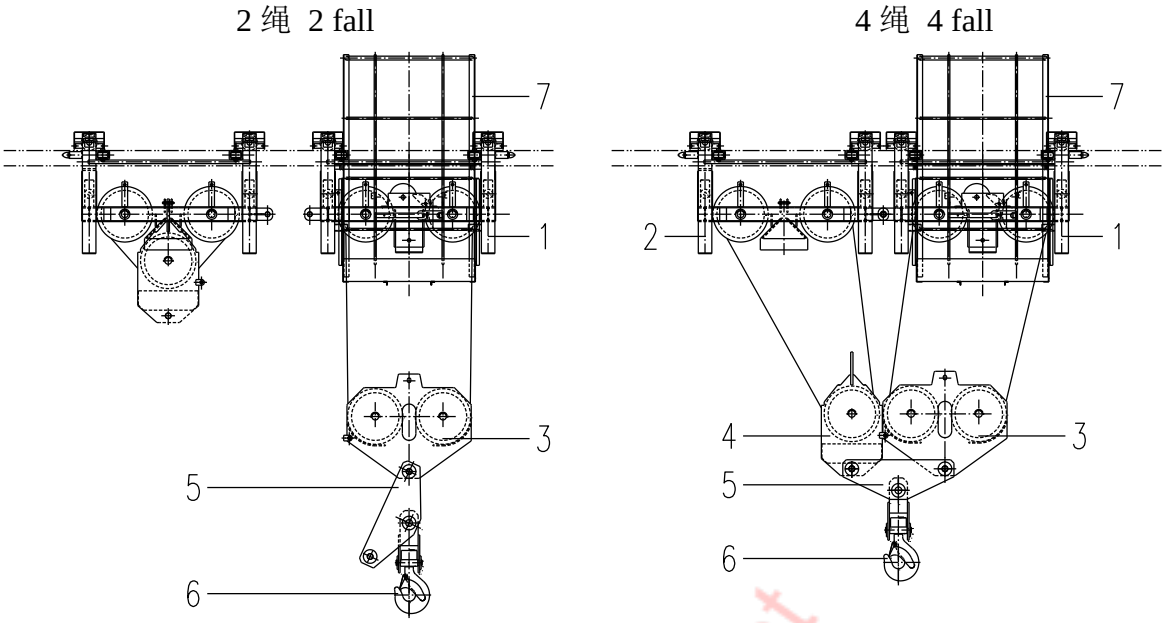


图 4-22 小车和吊钩 Fig. 4-22 Coupling Trolleys and Hook

2 绳时，只有前小车工作，后小车被限位于起重臂根部。

When the 2 fall，only front trolley works, the rear trolley is limited by the foot of the jib.

双小车和单小车之间相互变换，需连接或分离前滑轮组和后滑轮组，前滑轮组和后滑轮组的连接和分离是在无载荷、低速、不摆动的情况下在起重臂根部地面人工操作完成的。

The coupling and uncoupling operations of the trolleys must be carried out without load, at slow speed, without swinging and on the jib foot. Connecting or disconnecting the pulley blocks is carried out on the ground by hand, that of the trolley takes place without any manual intervention.

4.11.2 双小车的使用 The Coupling Trolleys Of Use

a.4 绳到 2 绳的变换方法 Changing from 4 falls to 2 falls

将前后小车移至起重臂根部直到安全装置切断小车运动为止。

Move the trolley on the jib foot until the safety devices cut the motion.

将滑轮组-吊钩下降至地面，并将其竖立放置。

Lower the pulley blocks-hook to the ground and rest them in upright position.

将连接扁担梁(5)和后滑轮组(4)的销(8)拆掉。

Remove the pin (8) connecting the pulley block link (5) to the rear pulley block (4).

取开(3)、(4)之间的挂钩。

Take off hook between assembly (3) and assembly (4).

再将后滑轮组(4)上的销(8)安装上。

Replace the pin (8) on the rear pulley block (4).

启动“起升”，使后滑轮组(4)吊离地面。继续起升，使后滑轮组(4)紧靠在后小车上。

Operate‘HOISTING’, the rear pulley block (4) lifts off of the ground. Continue raising, the rear pulley block (4) under the rear trolley.

并用销轴(9)锁定在后小车上。

Lock it on the back trolley by pin (9)

启动“起升”，使前滑轮组(3)吊离地面。

Operate‘HOISTING’, the front pulley block (3) lifts off the Ground.

用销(10)将后小车(2)销在起重臂上。然后取下销轴(11)，两个小车便分开并锁定在起始位置。此时，小车装置处于 2 倍率工作状态(即单小车工作状态)。

Insert the pin (10) into the dog so that locking the rear trolley(2) on the foot of jib.Then take down the pin (11), so the two trolleys were divided and locked on the state position.The trolleys equipment is in position for working with 2 falls.

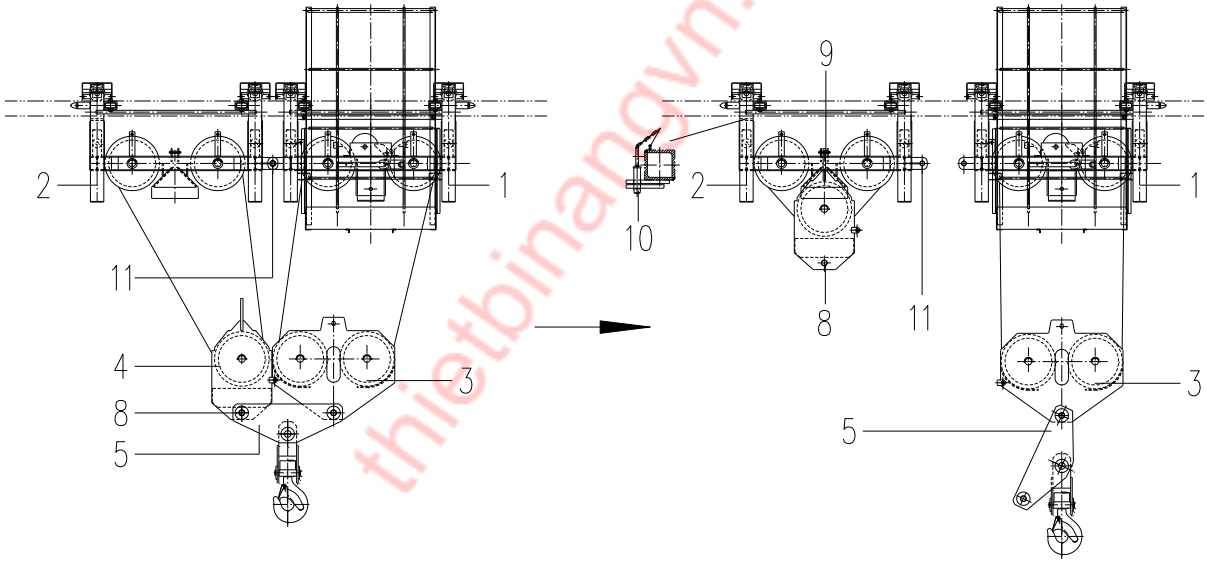


图 4-23 4 绳到 2 绳 Fig. 4-23 4 Falls To 2 Falls

b.2 绳到 4 绳的变换方法 Changing from 2 falls to 4 falls

将前小车(1)停在位于起重臂根部节的后小车(2)附近，将前小车的连接杆插入后小车的连接板中，并用销(11)插入，使两个小车连接到一起。

Move the front trolley (1) to the nearby of the rear trolley (2) on the jib foot ,then insert the connecting plate of the front trolley to the connecting plate of the rear trolley, and insert the shaft (11) making the two trolley connected.

将前小车上的滑轮组件(4)下降至地面，并将其竖立放置于一个支撑上。

Lower down the compositions (4) of the trolley to the ground, put it on a supporting vertically.

取掉销轴(9)，操作“下降”，后滑轮组(2)下降，一旦后滑轮组(2)下降接触地面，就将后滑轮组的钩在前滑轮组上。用销轴(8)将滑轮组扁担梁销接到后滑轮组(1)上并用挡板螺栓将其固定。

Unfit the shaft (9). Operate the ‘LOWERING’to make the rear trolley (2) lower down, once the rear trolley (2) just touch the ground, connect the beam of the trolley to the rear trolley by shafts (8) ,and fixed it by shafts and bolts.

取掉销轴(10)。

Unfit the shaft (10)

此时，装置处于 4 倍率工作状态(即双小车工作状态)。

Then the device should be 4 falls situation.

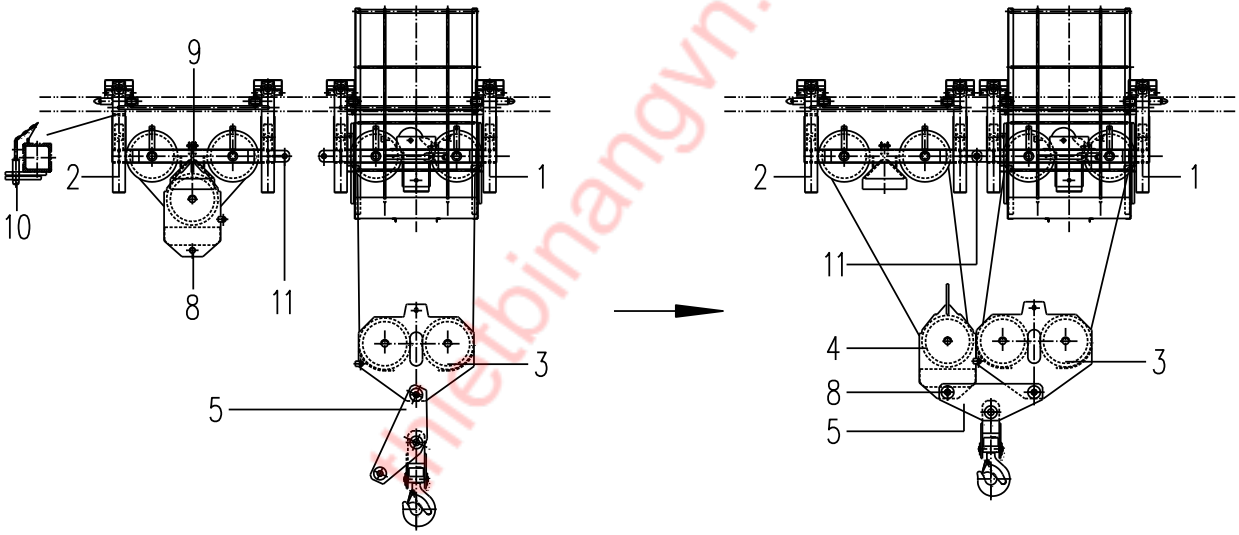


图 4-24 2 绳到 4 绳 Fig. 4-24 2 falls to 4 falls

4.11.3 安装牵引小车 Fitting The Jib Trolleys

小车装置的安装工作应该在地面组装起重臂的时候进行。

The trolley must be assembled before assembling the jib on the ground.

将小车安装到起重臂上，安装时要按照小车进入起重臂的方向。

Fitting the trolley on the jib, when fitting according the entrance direction of the trolley

从起重臂的一端引入后小车(2)和前小车(1)，从起重臂右侧安装钢丝绳张紧器(12)。

Introduce the back trolley (2) and the front trolley (1) from one end of the jib, assemble the steel cable tighten device (12) on the right of the jib.

用销轴(11)将两个小车锁在一起，用销轴将平台(10)固定在前小车(1)(起重臂右侧)上。

Lock the two trolleys by shaft (11), fix the platform(10) to the front trolley (1) on the right side of the jib by shaft.

为了避免在安装塔机时的意外事故，在起重臂或小车上进行各种工作之前，须用销轴(10)将小车销到臂架上。

In order to avoid any unintentional manoeuver during the erection or crane use, lock the trolley onto the jib by mians of the shaft (10) before carring out any operation on the jib or on the trolley.

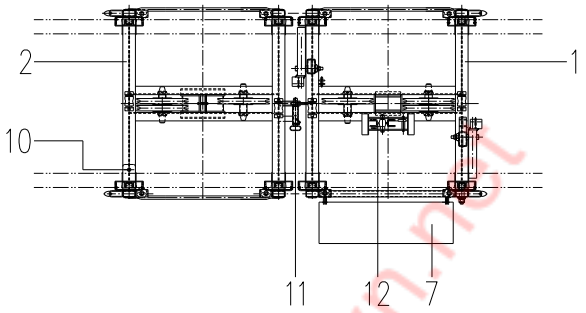


图 4-25 安装牵引小车 Fig. 4-25 Fitting the jib trolleys

4.11.4 牵引小车钢丝绳张紧方法 Operation of The Rope Tensioning Device

小车钢丝绳的张紧是通过钢丝绳张紧轮(1)实现的。

The tensioning of the trolley ropes is ensuved by the rope tensioning drum(1).

张紧钢丝绳，移动小车卷筒后臂根上的两个小车。用小车上的扳手(2)启动钢丝绳张紧轮(1)，并尽量拉紧前小车钢丝绳。(见图 4-26)

Tensioning the ropes.Move the trolley on the jib foot in the rear of the trolley winch.Using the lever (2) stored on the trolley, operate the ropethesioning drum (1) and tighten the front trolley rope to a maxiumun (see Fig.4-26).

沿起重臂将小车内、外移动数次，以便尽量均匀分配前、后钢丝绳的张紧度。

Move the trolley several times forward and backward over the while jib thegeh in order to distribute the tension as well as possible in the front and rear rope.

如有可能，尽量优化钢丝绳的张紧度。

Protect the tension of the ropes, if mcecddary.

拆卸钢丝绳时，使用扳手(2)放松钢丝绳，将钢丝绳拆卸。

When dismanting, use the lever (2) on the rope tensioning drum in order to slacken the ropes and to asslow them to the removed.

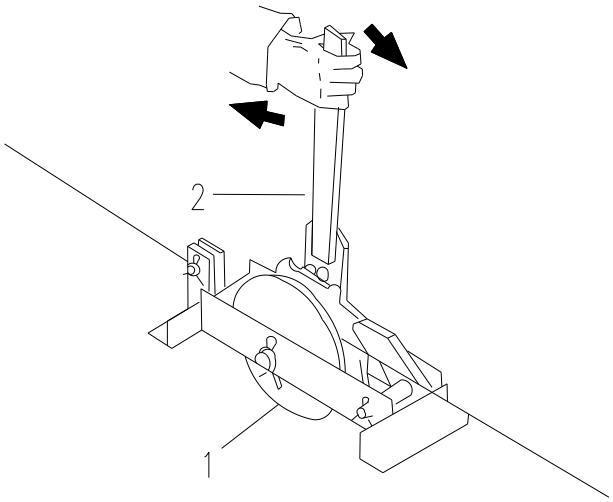


图 4-26 张紧小车钢丝绳 Fig. 4-26 The tensioning of the trolley ropes

4.11.5 牵引小车钢丝绳的穿绕方法 Reeving the trolley topes

a.牵引小车后部钢丝绳的穿绕方法：

Reeving the rear trolley rope

将牵引小车开至臂架根部止动块处。

Travel the trolley up to the stops on the jib foot.

从卷筒旋出后钢丝绳，长度参见下表。

Unwind the wear rope from the reel. This rope length see table on opposite page.

表 4-4 Table 4-4

起重臂 Jib	30m
前绳 Front rope	55m
后绳 Rear rope	45m

钢丝绳依次穿过臂架上的 2 个滑轮，后小车上的断绳保护器，前小车的断绳保护器。最后固定在张紧轮上。

Anchor the rope extremity which has no thimble, on the drum flange by means of bulldog grips provided for this purpose.Wind the rope on the drum from underneath until it is possible to anchor the other rope extremity on the trolley using one shaft and two split pins.

张紧轮牵引小车后钢丝绳。

Tighten the rear rope.

b.牵引小车前部钢丝绳的穿绕方法：

Reeving the front trolley rope

从卷筒绕下前牵引绳。钢丝绳长度视起重臂长度而定，参看表 4-4。

Unwind the front rope from the reel. This rope is decided according to the length of the jib used, see Table 4-4.

将钢丝绳穿过 2 个臂架滑轮和端部节滑轮。并将其尾端固定在前牵引小车的套环上。

Reeve the rope on the pulleys 3-4-5, make 3 dead turns on the drum winding the rope from above and anchor using bulldog grips located on the drum flange of the winch.

张紧前牵引绳。检查钢丝绳张紧情况。

Tighten the front rope.Check the rope tightening.

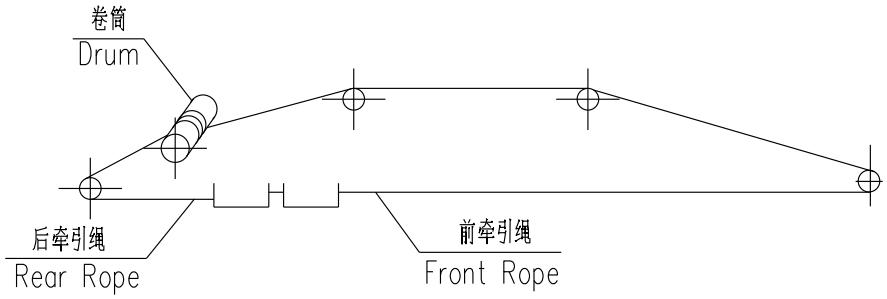


图 4-27 穿饶钢丝绳 Fig. 4-27 Reeving the trolley ropes

4.11.6 小车断绳保护器的工作原理 Working principe of the pivoting arm

本塔机的小车安装了断绳保护器，此装置包括：

This crane is device with pivoting arms for the trolley, This device comprises:

a.一个小车前牵引绳摇臂(1)。

1 pivoting arm (1) for the front trolley rope.

b.二个小车后牵引绳摇臂(2)。

2 pivoting arms (2) for the rear trolley rope.

这种装置用于小车钢丝绳破断时制动起重臂上的小车。如遇小车钢丝绳断绳，摇臂在两端重力不平衡下一端上翘，卡在起重臂水平腹杆上，从而将小车停在臂架上。

This device immobilizes the trolley on the jib in case of trolley rope breakage. This device blocks the trolley onto the jib on the case of a trolley rope breakage. The pivoting arm keeps not balance because of gravity, and is stopped on the beam of the jib, so the trolley stops on the jib.

安装牵引小车前牵引绳时：

When fitting the trolley ropes:

a.检查断绳保护器的工作状态。

Check the good working order of the pivoting arms.

b.将钢丝绳穿过断绳保护器上的孔(3)。

Run the rope of trolley through the hole (3) of the pivoting arms.

在塔机工作过程中，要定期检查牵引钢丝绳的张紧情况，以确保断绳保护器摇臂处于水平位置。

During crane work, periodically check the rope tighten in order to maintain the pivoting arms in the horizontal position.

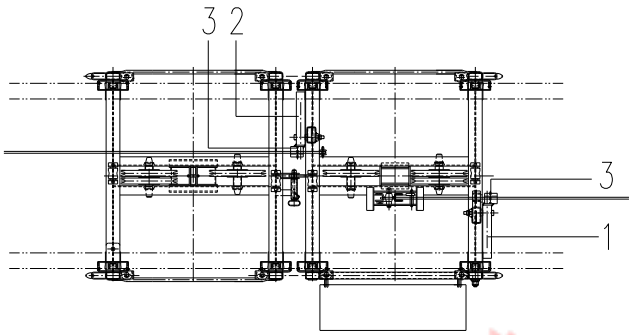


图 4-28 断绳保护器 Fig. 4-28 Pivoting arm

4.12 安装平衡臂和起重臂 Fitting the counter-jibs and jibs

4.12.1 引言 Introduction

本节对平衡臂和起重臂的安装程序做了说明。

This manual describes the mounting sequences of the counter-jib and jibs.

安装操作分三步进行：

These mounting operations of the crane out in 3 phases:

(1)所要吊装的塔机部件的准备和装配；

Preparation and equipment of the crane part to be lifted

(2)挂吊具；

Fitting the slings

(3)把组件安装在塔机上；

Fitting the crane parts onto the crane.

以下依次说明每一步骤的作业，首先说明平衡臂，然后说明起重臂。

The following operations describe each step in turn, first the balance arm, then the lifting arm.

平衡臂有两种装法：

As regards the counter-jib, there are two possibilities.

吊装整臂；

Fitting the complete counter-jib.

吊装臂根节，然后再吊装臂端节。

Fitting the counter-jib foot and then the nose.

起重臂有一种装法：

As regards the jib, there are one possibilities.

吊装整臂。Fitting the complete jib.

4.12.2 平衡臂的整体吊装 Fitting the complete counter-jib.

a.平衡臂的整体吊装准备 Preparing the complete counter-jib

在地面上,用 4×90 销轴(3)将平衡臂端部节(1)和平衡臂根部节(2)组装起来。在臂端部节和根部节之间上装上连接走道(4)。将平衡重托架(5)吊装到平衡臂端。安装时使用 4×50 销轴(6)。按详图 A 组装走道。装上两侧护栏。护栏之间用卡箍(7)连接，并在(8)处插入护栏用开口销锁住。装上端部护栏(9),用 8×16 轴销(10)按详图 B 将其固定,并在（11）处将其锁连。

On the ground, assemble the counter-jib nose (1) with the counter-jib foot (2) using 4×90 shaft (3).Fit the small connecting catwalk (4) between the counter-jib nose and foot. Fit and assemble the ballast support (5) on the counter-jib nose using 4×50shaft (6).Fit or down the catwalks and assemble them according to detail A. Place the lateral grab rails and interconnect them by means of parts (7);split-pin at (8).place both end grap rails (9),fix them using 4×16 shaft (10) according to detail B and pin-connect them at (11).

按前述将平衡臂风帆装上，在吊装平衡臂之前，放上连杆(一)和平衡臂横杆（12）,吊装后，该平衡臂横杆与塔头撑架上的拉杆(13)销联在一起。在平衡臂端系一根牵引绳，以便从地面上控制吊装方向。

Fit the counter-jib plates according to brochure. Before raising the counter-jib, position connecting rod and cross-bar(12) which will be pin-connected with those of the strut (13).Attach a cord at the counter-jib nose so as be able to guide it from the ground.

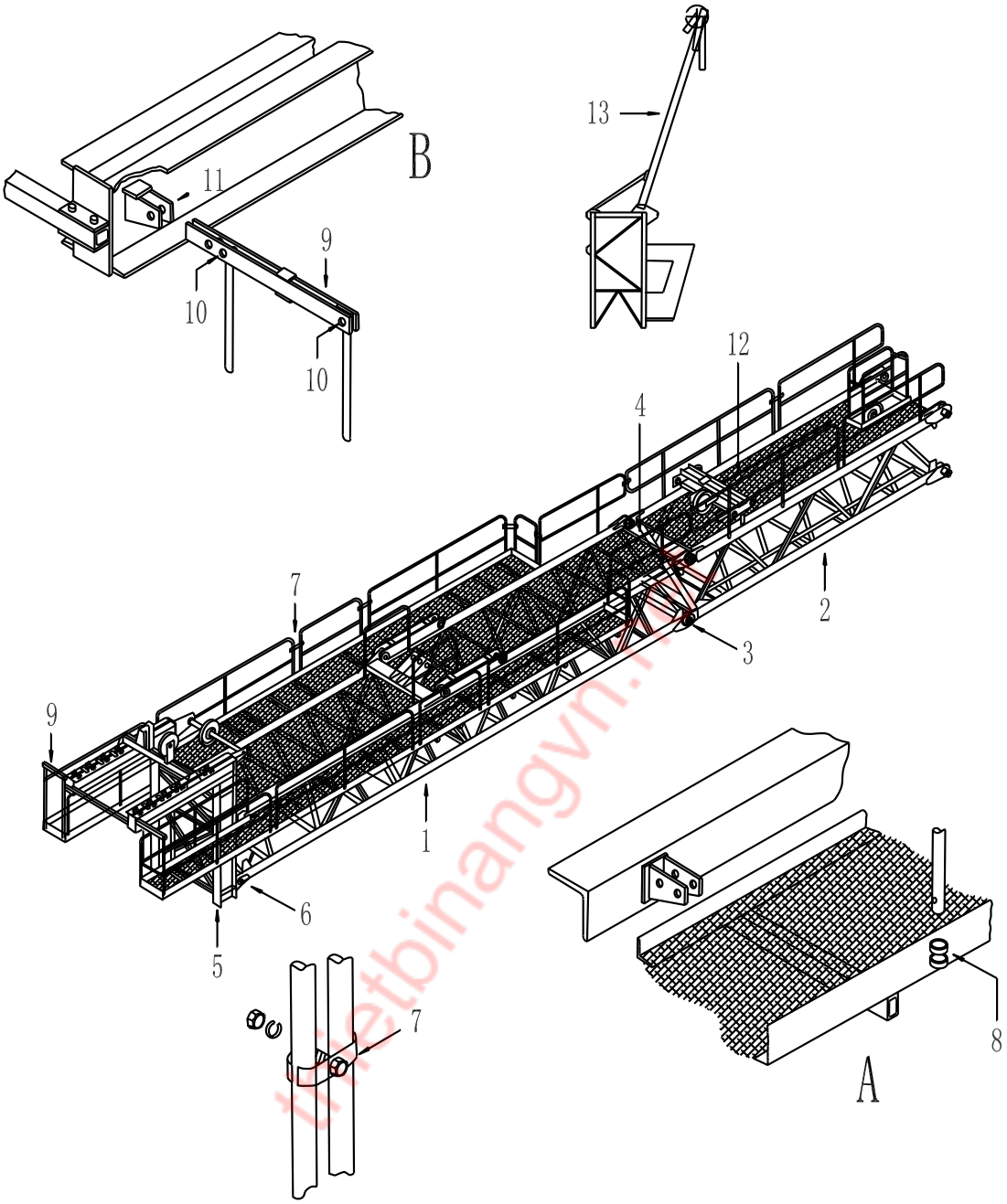


图 4-29 吊装准备 Fig. 4-29 Preparing the complete counter-jib

b.平衡臂的整体吊装 Slinging and fitting the completev counter-jib

吊装平衡臂需用 12 米吊索两根（ϕ21.3*mm*）(1)。将吊索挂在平衡臂端部节的四个规定吊点上。

To fit the counter-jib use two 12m slings(ϕ21.3*mm*)(1).Run the slings around the four points provided on the counter-jib nose.

将平衡臂从地面上吊起，要注意吊物是否平衡。吊起后使平衡臂略向前倾，到位后，穿上上面的两个轴销(2)。并用开口销锁住。

Lift the counter-jib up from the ground and check its stability. The counter-jib being slightly

inclined towards the front, raise it and pin the two upper shafts (2) which are already positioned in the shaft inserting devices-split-pin.

下放平衡臂，以便销安装两个下轴销(3)，并插上开口销。平衡臂安装就绪后，即可拆去吊具（1）。

Lower in order to pin the two lower shafts (3); lock by split-pin. As the counter-jib is inserted and pin-connected onto the cab mast, remove the slings(1).It is have to Fitting one ballast.

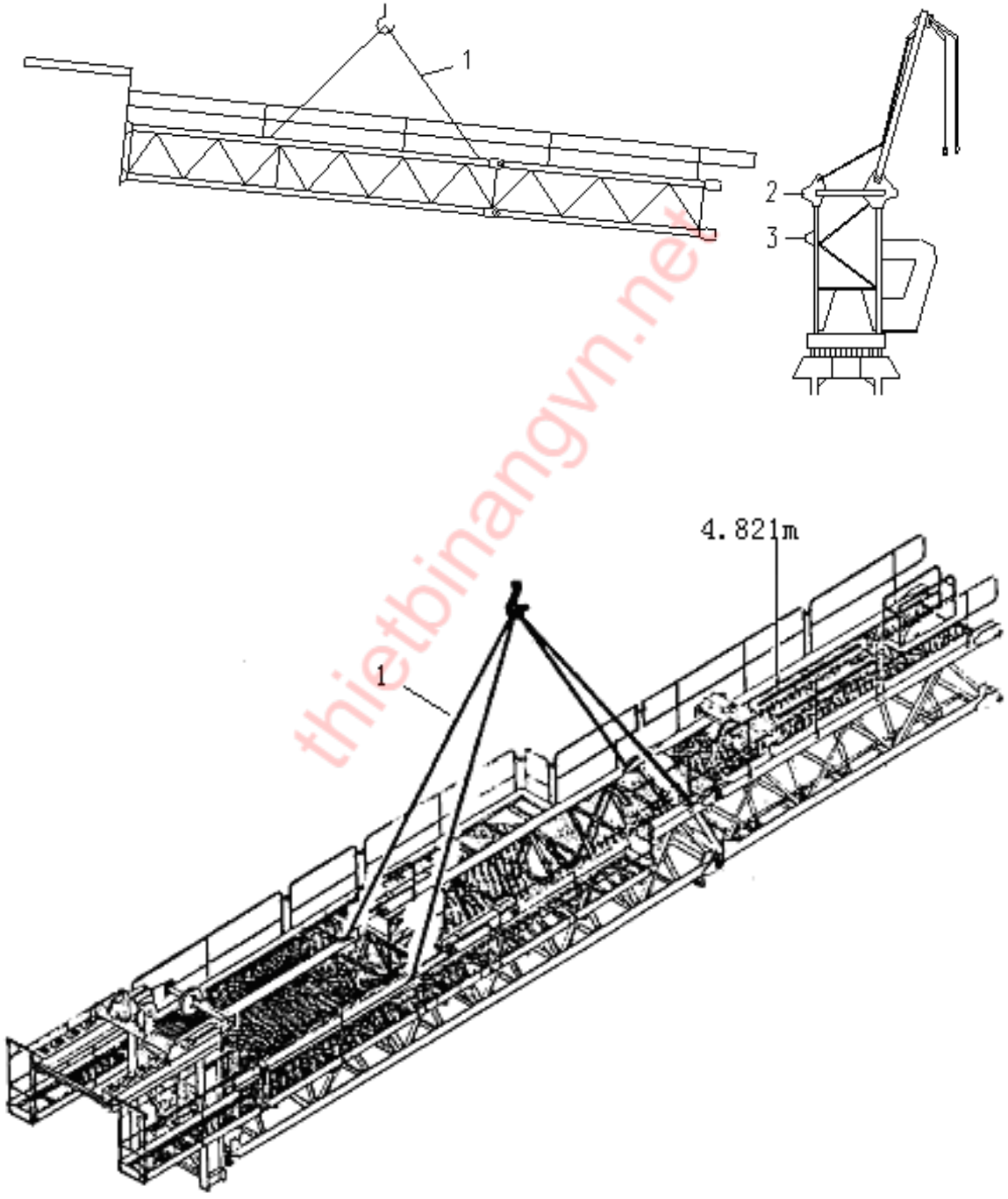


图 4-30 吊装平衡臂 Fig. 4-30 Sling and fitting the counter-jib

4.12.3 平衡臂的分段吊装 Fitting the counter-jib.

a.平衡臂的分段吊装准备 Preparing the counter-jib

用 4×50 销(3)将平衡臂配重支架(1)装在平衡臂端部节(2)上。

Fit and assemble the ballast support (1) on the counter-jib nose (2) using 4×50 shaft (3).

按照详图 A 组装平衡臂端部节平台(4)。

Fit or fold down the counter-jib nose catwalks (4) and assemble them according to detail A.

安装栏杆(5)，并将栏杆之间用夹板(6)固定。

Place the lateral grab rails (5) and interconnect them by means of parts (6) ;

按详图 A 和详图 B 在(7)处用开口销销上。

Split pin a (7) according to details A and B.

装上两个端都护栏（8），用 8×l6 轴销(9)按图 C 将其固定，并在(10)处用销子连上。在平衡臂根部(12)上装上侧护栏(11)，用卡箍(6)将其组接起来并按详图 A 和 B 在(7)处用开口销锁住。将平衡臂风帆板装在平衡臂端部。在平衡臂根部节上安装连接横梁(13)。在吊装平衡臂根部节之前，放上 4.821m 拉杆(14)。吊装后该拉杆与塔头塔撑拉杆(15)销联起来。在平衡臂根部系一根绳子，以便在提升时能从地面控制悬吊方向。然后再按同样程序将平衡臂端部节装上。

Place both end grab rails (8),fix them using 8×16 shaft (9) according to detail C and pin-connect them at (10) Position the lateral grab rails (11) onto the counter jib foot (12),interconnect them by means of parts (6) and split-pin at (7) according to details A and B. Rest the counter-jib plates onto the counter-jib nose until they will be fitted. Fit the counter-lib yoke (13) onto the counter-jib foot. Before raising the counter-jib toot position two 4.821m tie bars (14) which will be pin-connected with those of the strut (15). Attach a cord at the counter-jib foot so as to be able to guide it from the ground when raisingcarry out the same operation for the counter-jib nose.

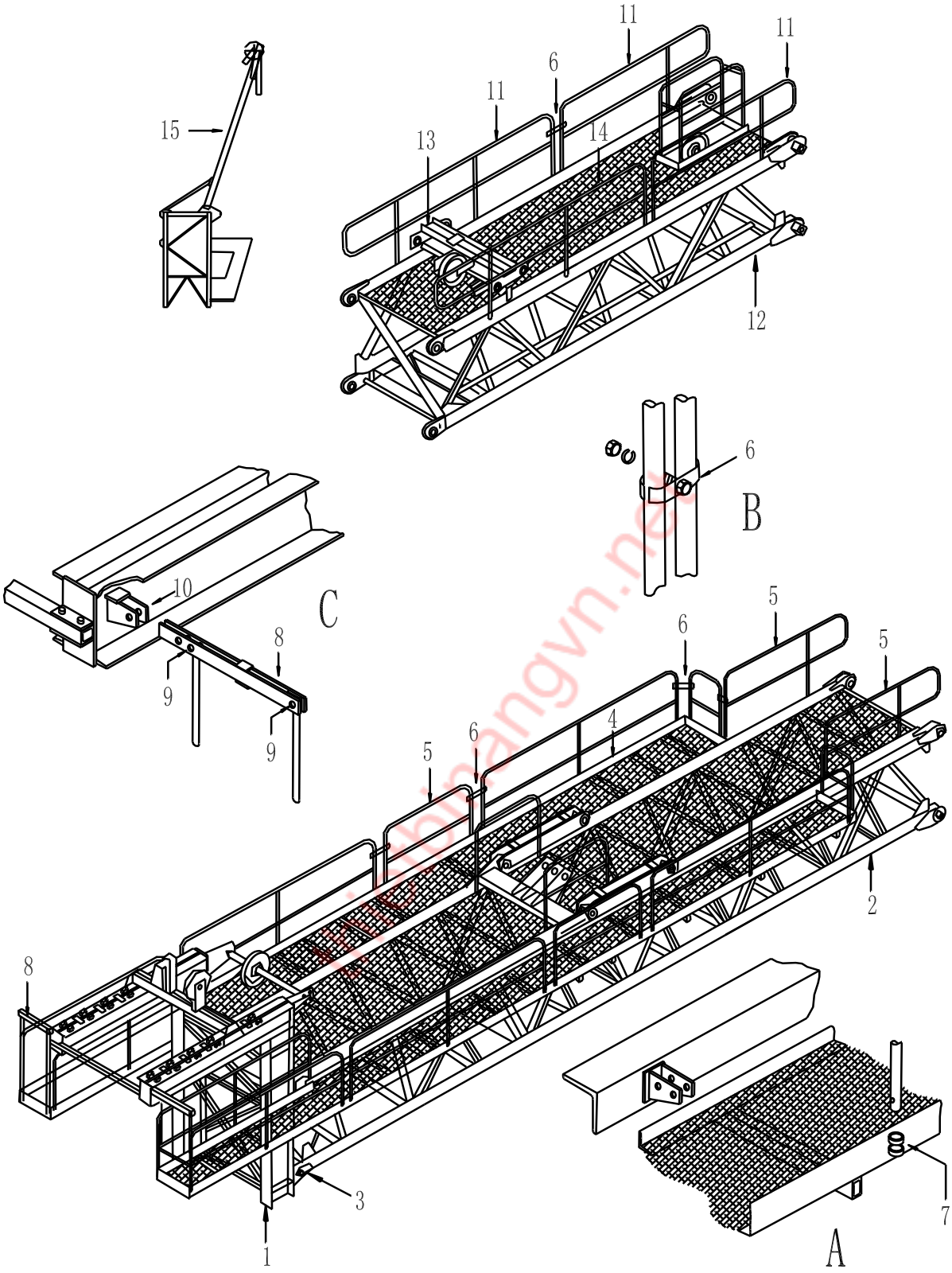


图 4-31 吊装准备 Fig. 4-31 Preparing the counter-jib

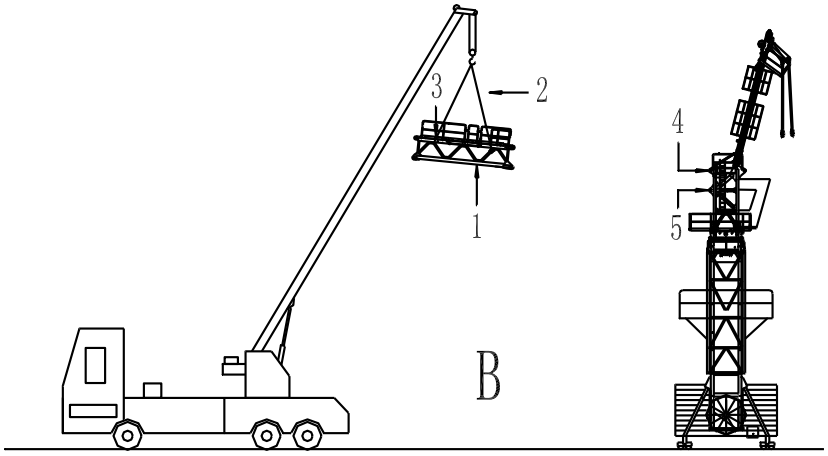
b. 平衡臂根部的吊装 Slinging and fitting the counter-jib foot

吊装平衡臂端节(1)需用 8mϕ21.3mm 吊索(2)四根。按详图 A 在平衡臂根的腹杆靠近节点处挂上吊具。这样吊装是为了使平衡臂根部能如图 B 所示微向前倾斜。在吊装平衡臂根节前，一定要在其上装上平衡臂连节横梁(3)。从地面上将平衡臂根吊起时，注意是否平稳。用辅助吊车将平衡臂根节吊至上销连接点之上，然后下放，将上轴销(4)穿上，并加开口销。继续下放。直至两根下轴销(5)能插入，加开口销。

To fit the counter-jib foot (1) use four 8m ϕ21.3mm slings (2). Fit these slings between the diagonals of the counter-jib foot according to fig. A. Fit the slings so that the counter-jib foot slightly inclined towards the front as shown in fig B. When raising the counter-jib foot make sure that the counter-jib yoke (3) is attached onto the foot. Lift the counter jib foot up from the ground and check its stability. Raise it by means of the mobile crane above the upper fixing points, lower and bolt the upper pins (4) placed in the pin inserting devices; then split-pin. Continue lowering until the 2 lower pins (5) can be inserted; split-pin.

拆掉吊具。

Free the slings.



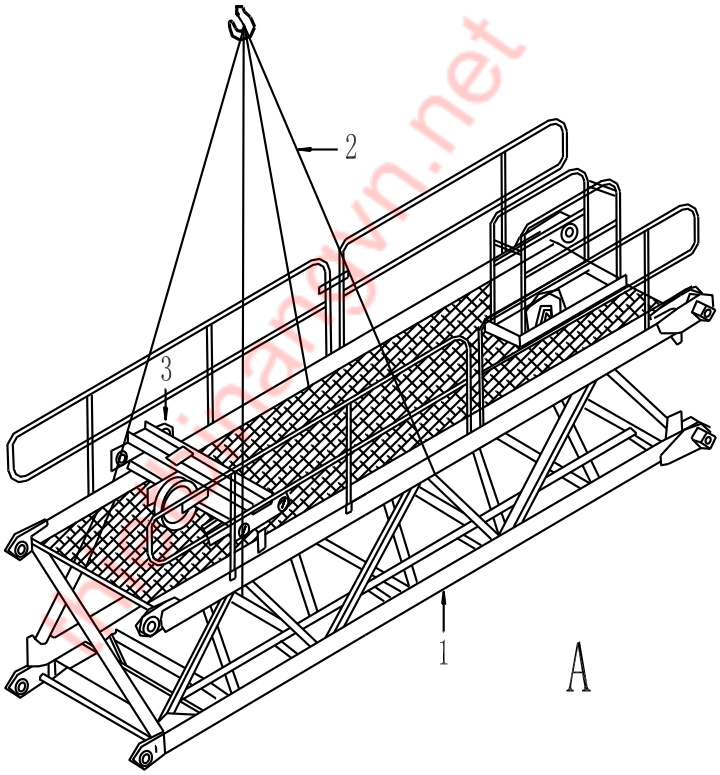


图 4-32 吊装根部节 Fig. 4-32 Sling and fit the counter-jib foot

c. 平衡臂端部的吊装 Slinging and fitting the counter-jib nose

吊装平衡臂端节(1)需用 8mϕ21.3mm 吊索(2)四根挂绳吊装时，应使平衡臂端如 A 图所示向前斜。如图 B 所示，前部吊绳应用吊点(3)，后部用卷扬机托架角板(4)作为吊点。

To Fit the counter-jib nose (1) use four 8m ϕ21.3mm slings (2).Fit the slings so that the counter-jib nose is slightly inclined towards the front as shown in fig.A. Use the slinging points (3) at the front and the winch support gussets (4) at the rear according to Fig.B.

用辅助吊车将平衡臂端从地面上吊起，注意检查其是否平稳，然后将平衡臂端吊至上销

连接点的上方。然后下放，穿入两根上轴销(5)；再加上开口销。

Lift the counter-jib nose up from the ground and check its stability. Raise it by means of the mobile crane above the upper fixing points, lower and bolt the 2 upper pins (5) placed in the pin inserting devices; then split-pin.

继续下放，直到两根轴销(6)能插入，再上开销。拆除吊具。铺上平衡臂根和臂端之间的连接走道，并将存放在平衡臂端的护栏装上。

Continue lowering until the 2 lower pins (6) can be inserted; split-pin. Free the slings. Fold down the connecting catwalk between the foot and the nose and fit the grap rails stored on the counter-jib nose. It is have to Fitting one ballast.

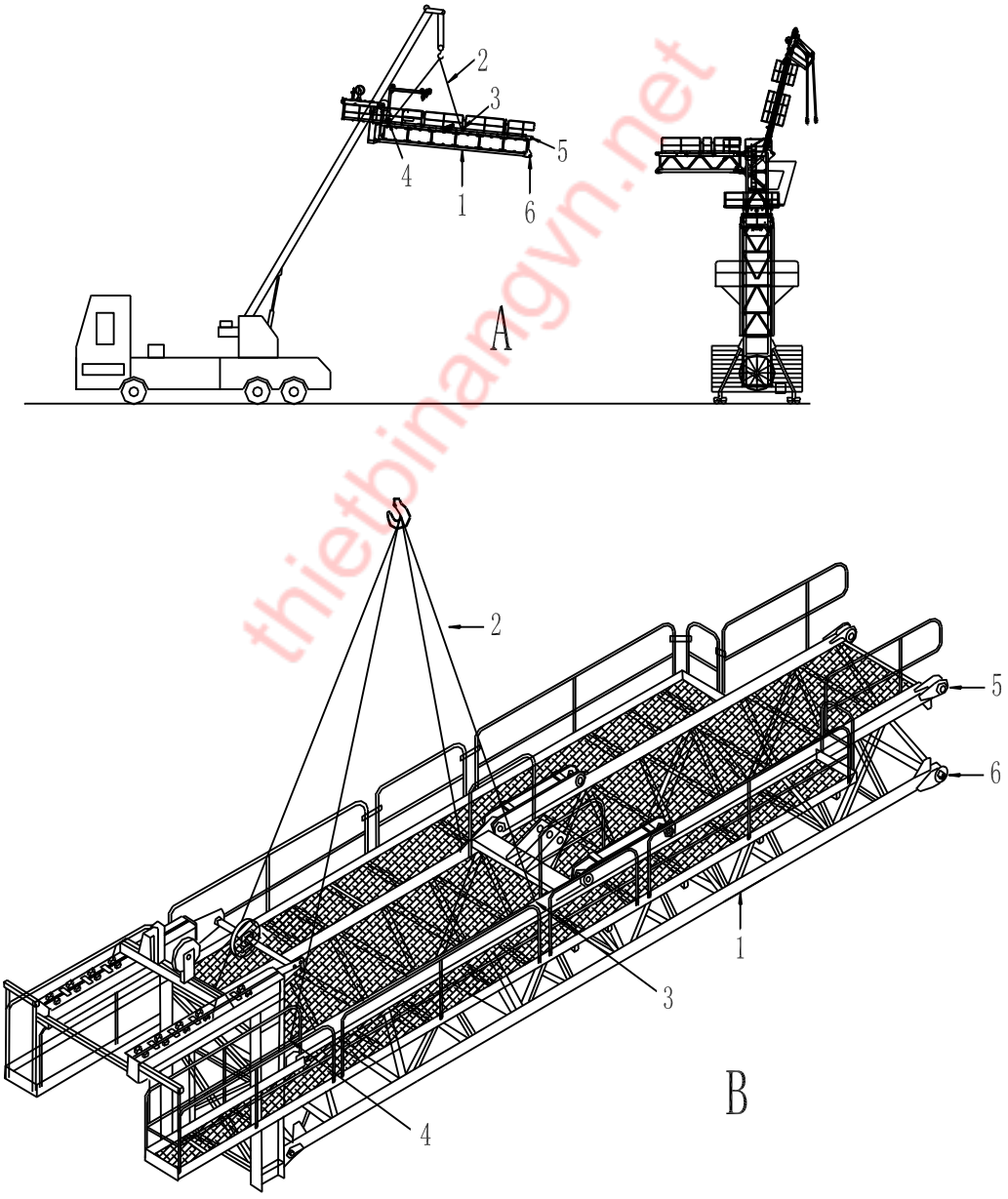


图 4-33 吊装端部节 Fig. 4-33 Sling and fit the counter-jib nose

d. 起升机构的安装-拉杆的准备 Fitting the hoist winch-preparing the tie bars

在地面上，将三根 4 米吊索挂在提升卷扬机上，并用三个钢丝绳夹头将吊索固定在卷扬机台座的吊环上。

On the ground, fit 4m slings (1) on the hoist winch, and use 3 shackles to fix them at the rings of the winch platform.

然后吊起起升机构，并将其置于平衡臂上，然后按详图 A 用 4 个轴销(2)，将其安装好。然后拆掉吊具。

Raise the winch and position it onto the counter-jib, then pin-connect it using 4×1 shaft (2) according to detail A. Remove the slings.

将 4.821m 拉杆(3)与塔头撑架拉杆(4)用销轴连起来。然后再将组合的拉杆与平衡臂上的连接横梁(5)销连起来，用固定在(7)处的张紧器(6)拉塔头撑架并张紧拉杆。将张紧器钢绳(8)穿过滑轮(9)，再按详图 B 将其固定在平衡臂端的一点上。

Pin-connect the 4.821m tie bars (3) with tie bars (4) of the strut, the whole assembly being pinned on the counter-jib yoke (5). For raising the strut and tightening the tie bars. use a Tirfor (6) fixed at (7). Run the Tirfor rope (8) over the yoke pulley (9) and anchor it at a point of the counter-jib nose according to detail B.

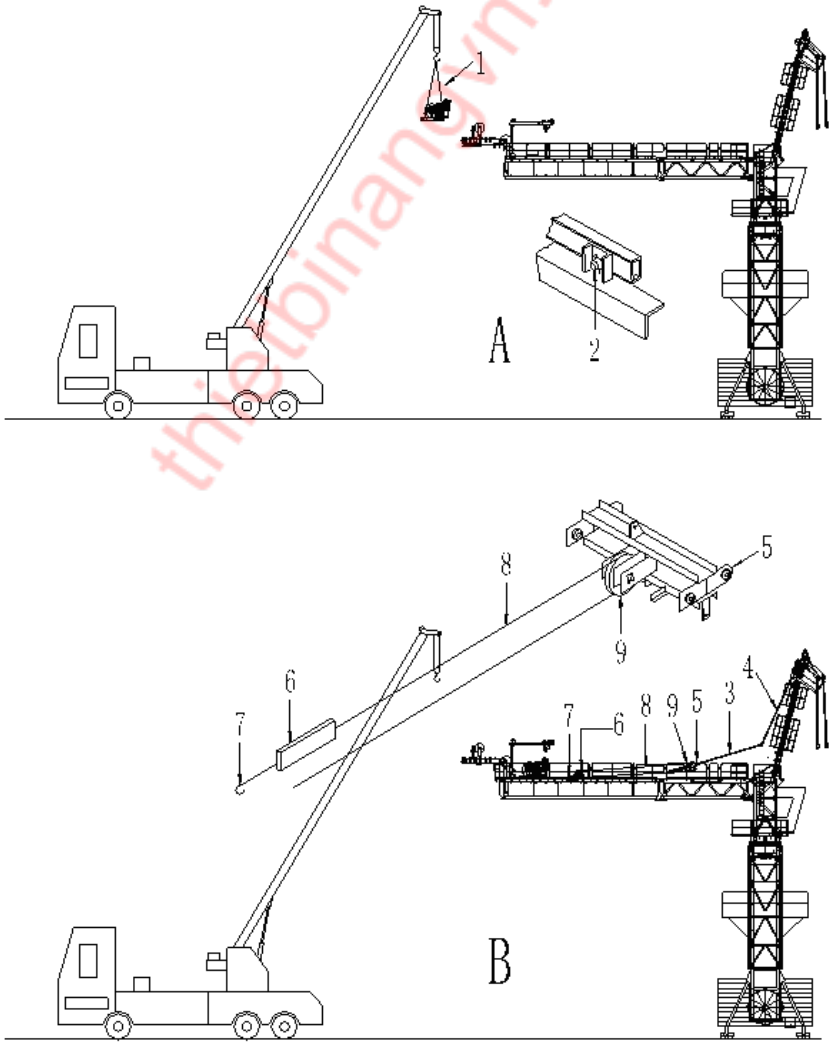


图 4-34 安装平衡臂拉杆 Fig. 4-34 Fit the counter-jib bar

4.12.4 起重臂的吊装准备 Preparing the jibs

将起重臂根部适当垫高，使小车能安装上去。装上带检修平台的小车，并将其固定在起重臂根部。装上起重臂根部护栏，按所需臂长组装起重臂节。将托架(1)固定在起重臂的上弦杆上，需使托架上的圆杆(2)适自地嵌在斜撑杆之间，以防止拉杆转动（详图 A）。在下拉杆(4)上装上托架(3),以便放入上拉杆(5)(见详图 B)。销连下拉杆(4)和上拉杆(5)。

Pack up tile jib foot sufficiently so that the jib trolley can be fitted Mount the trolley , equipped with its inspection platform and block it on the jib foot. Fit the jib foot grab rail. Assemble the jib sections according to the required jib length. Fit the brackets (1) onto the upper jib section member making sure that the round bar (2) of the half collars engages properly between the diagonals in order to prevent any tilting of the tie bar line (detail A). Onto the lower tie bars (4) mount and fix the brackets (3) into which the upper tie bars (5)will engage (detail B).Mount and pin connect the lower tie bar line (4) and the upper tie bar line (5).

下拉杆(4)和上拉杆(5)暂下与拉杆(6)和（7）联在一起。拉杆(6)和(7)如详图 C 所示用连接杆(8)和(9)装在塔头撑架上。

The tower (4) and upper tie bar lines (5) are missing the tie Bars (6) and (7) which are fitted onto the strut by means of the connecting links (8) and (9) as shown in detail C.

用三个钢丝绳夹头将安全绳（10）装在臂端上(详图 D)，将其穿过起重臂上的挂钩，并用三个钢丝绳夹(11)将其固定在起重臂根的连接板上(详图 E)。

Fit the safety rope (10) at the jib nose using three bulldog grips (Detail D) run it through the hooks provided on the jib and fix it on the jib foot gusset using three bulldog grips (11) (detail E).

在起重臂端系一根绳子，以便在地面上控制吊装起重臂的方向。

Fasten a cord on the jib nose , thus allowing to guide the jib from the ground.

注：在提升起重臂之前，按详图 F，用短绳(12)将拉杆(4)和(5)捆绑在臂根的上弦杆上。

NOTE: Before raising the jib attach the tie bars (4) and (5)onto the upper member of the jib foot using a short sling (12) placed behind the tie bar head according to detail F.

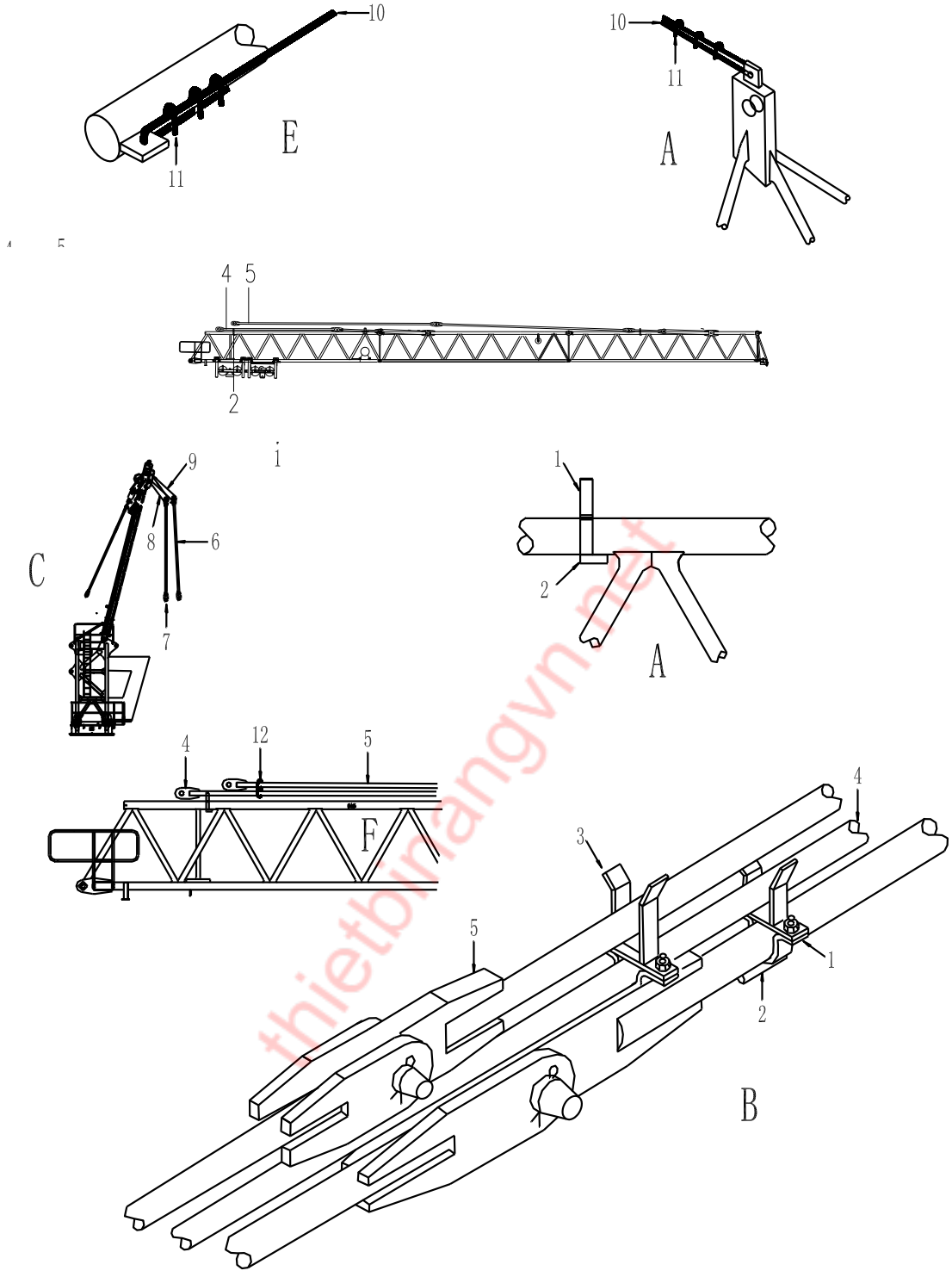


图 4-35 安装起重臂拉杆 Fig. 4-35 Fit the jib bar

4.12.5 起重臂上安装吊索 Fitting the slings

臂架上标出的尺寸(见下图)相当于重心到臂根的理论距离。

The dimension marked on the jibs (see opposite sketch) corresponds to the theoretical distance between the center of gravity and the jib foot.

吊点只是理论上的，必要时可将臂架吊起 10 厘米高度再调吊点位置。

These slinging points are theoretical. Raise the jib about 10cm and adjust the slinging points if

necessary.

注意:检查一下吊索的位置，应是或者安装在臂架上弦杆的节点前(a)或者安装在节点后(b)，绝对禁止放在斜腹杆之间(c),在吊点处，钢丝绳之间不要挤压拉杆。

IMPORTANT:Check that the slings are fitted either in front of (a)behind(b) a node of the upper member and not between the diagonals (c).Do not jam the tie bars between the rope lines at the slinging point.

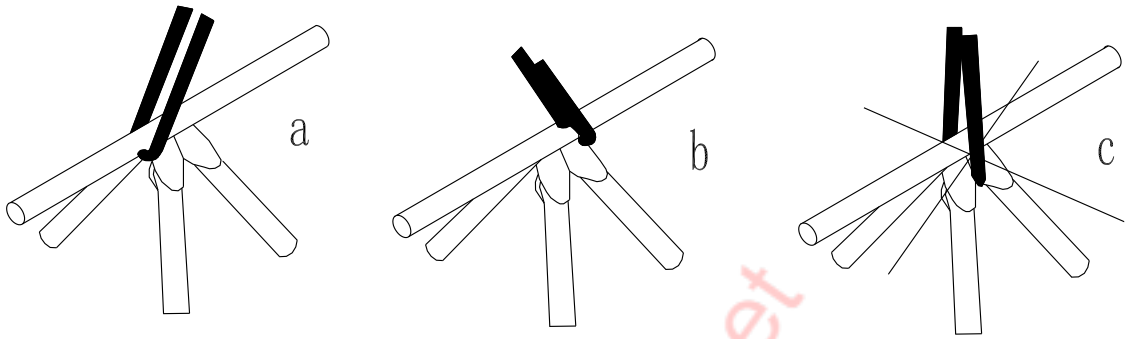


图 4-36 安装钢丝绳 Fig. 4-36 Fitting slings

4.12.6 起重臂的安装 Fitting the jib

起重臂的安装分三步骤进行:

The jib fitting is carried out in three phases.

A—吊起起重臂 B—将拉杆穿销连接 C—张紧拉杆

A-Raising the jib B-Pinning the tie bars C-Tightening the tie bars

第一步骤 A:按下图所示的吊点，在起重臂上挂上 12 米ϕ23.3 吊索(1)两根，在臂端系绳两根,以便在吊装中导向。用辅助吊车将臂吊至销接点以上,然后逐渐下放至两个臂根销(2)能穿上处;上开口销。

First phase A: Fit two 12m ϕ23.3 slings (1) around the jib, slinging points indicated on follow detail. Fasten two cords on the jib nose so as to guide the jib whilst raising. By means of the mobile crane, lift the jib up over the pinning points, then lower so that the two jib foot shafts (2) can be pinned; split-pin.

第二步骤 B:继续提升起重臂,直至拉杆(3)和(4)能与塔头撑架拉杆销连(详图 A)。使用张紧器(5)以便张紧平衡臂拉杆。抽掉连杆(6)的轴销,并将连杆折回平衡臂一侧。

Second phase B: Continue raising by means of the mobile crane until the tie bars(3)and(4)can be pin-connected with those of the strut(detail A). Operate the “Tirfor”(5) in order to tighten the counter-jib tie bars. Withdraw the shafts of links (6) and fold the latter back onto the counter-jib.

第三步骤 C：张紧器继续工作,使塔头撑架向后倾斜,起重臂拉杆张紧。按详图(B)将平衡臂连接横梁(7)与连杆(8)销连起来。拆掉张紧器,松开吊具。

Third phase C: Continue operating the “Tirfor”,the strut tilts backwards. The jib tie bar lines are tightened. Pin-connect the counter-jib yoke (7) to the links (8) according to (detail B).Remove the “Tirfor”, loosen the slings.

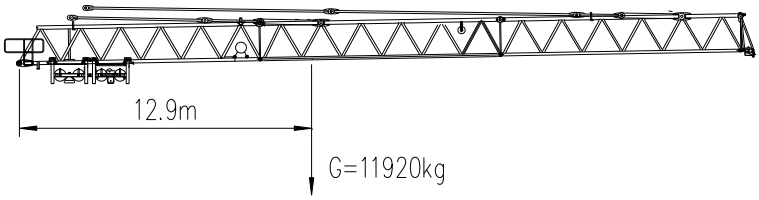


图 4-37 重心位置 Fig. 4-37 Center Of Gravity Position

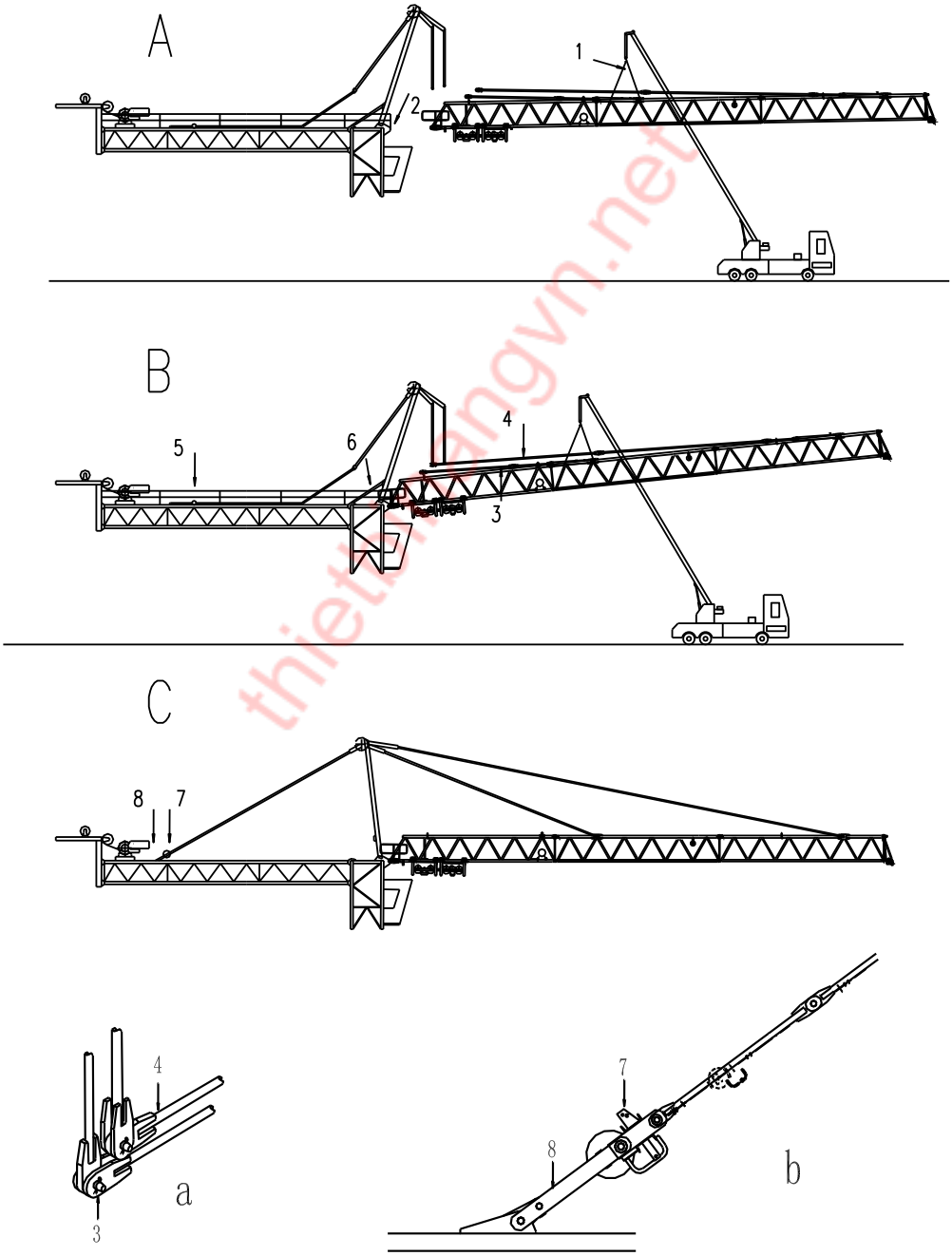


图 4-38 安装起重臂 Fig. 4-38 Fitting the jib

4.13 穿绕起升钢丝绳 Reeving the hoist rope for working

4.13.1 引言 Introduction

钢丝绳通常是缠绕在卷筒上的，以便于塔机异地安装时运输，如遇以下原因，可将钢丝绳拆除。

The hoist rope is normally supplied wound up onto the hoist drum. For further erections the hoist rope transport must be maintained in this manner except that the hoist rope must be removed for the following reasons:

拆塔机时发现钢丝绳磨损。

Rope wear noticed when dismantling

钢丝绳长度不符合新的工作高度。

Rope length not corresponding to the new working height.

4.13.2 起升钢丝绳的选择 Choice If Hoist Rope

建议根据工作高度和使用期限选择钢丝绳长度。

It is most advisable to adapt the length of the rope in accordance with the height and duration of use at that moment.

下表是根据塔机的安装情况，对各种不同高度及不同机构时所用的钢丝绳长度加以说明。

The following tables illustrate the various height stages according to the equipment of the crane.

表 4-5 Table 4-5

标准节数量 The number of mast	行走式起升高度 Hoisting height of traveling	钢丝绳长度(4 绳) The length of the rope(4 fall)
6	55.53m	368
5	49.75m	345
4	43.97m	322
3	38.19m	299
2	32.41m	276
1	26.63m	253
0	20.85m	229

4.13.3 起升钢丝绳的穿绕方法 Reeving The Hoist Rope

将钢丝绳恰当地缠绕到钢丝绳托架(1)上，然后缠绕的臂架根部节上的称重滑轮(2)上，最后缠绕到滑轮(3)上。

Rum the rope successively over the fleeting pulley (1), over the load weighing pulley (2) on the jib foot, over the pulley (3).

将钢丝绳拉至位于根部的小车上。

Bring the rope to the jib trolley located at the jib foot.

按照图中所示顺序缠绕钢丝绳。须在地面上将滑轮组竖立起，以避免钢丝绳的磨擦。

Carry out the rope reeving according to details the pulley blocks are propped up vertically on the ground in order to avoid any rope fiction.

将钢丝绳配装上钢丝绳楔套(4)并将一个绳夹(5)置于钢丝绳绳头。在大约距钢丝绳端一米处用两个绳夹固定一个销，以便在起吊滑轮组时确定滑轮与钢丝绳导向器之间的临时固定点。

Equip the rope with the rope anchor box (4) and fit a bulldog grip (5) onto the dead lin.About 1m from the rope end, fix a pin using 2 bulldog grips thus ensuring the temporary fixed point between the pulley and the rope guide when raising the pulley blocks.

将滑轮组从地面上吊起，将小车移动至臂端(如果有必要时，可以启动“起升”“下降”的方法松开钢丝绳)。

Lift up the pulley blocks and move the trolley to the jib nose(if necessary, slacken the rope by controlling<hoist-down>).

用一根销轴和两根开口销将旋转器钢丝绳与楔套安装上并检查旋转器的旋转情况。

Fit the rope anchor box onto the rope swivel by means of shaft (2) and several split-pins, Check the rotation of the rope swivel.

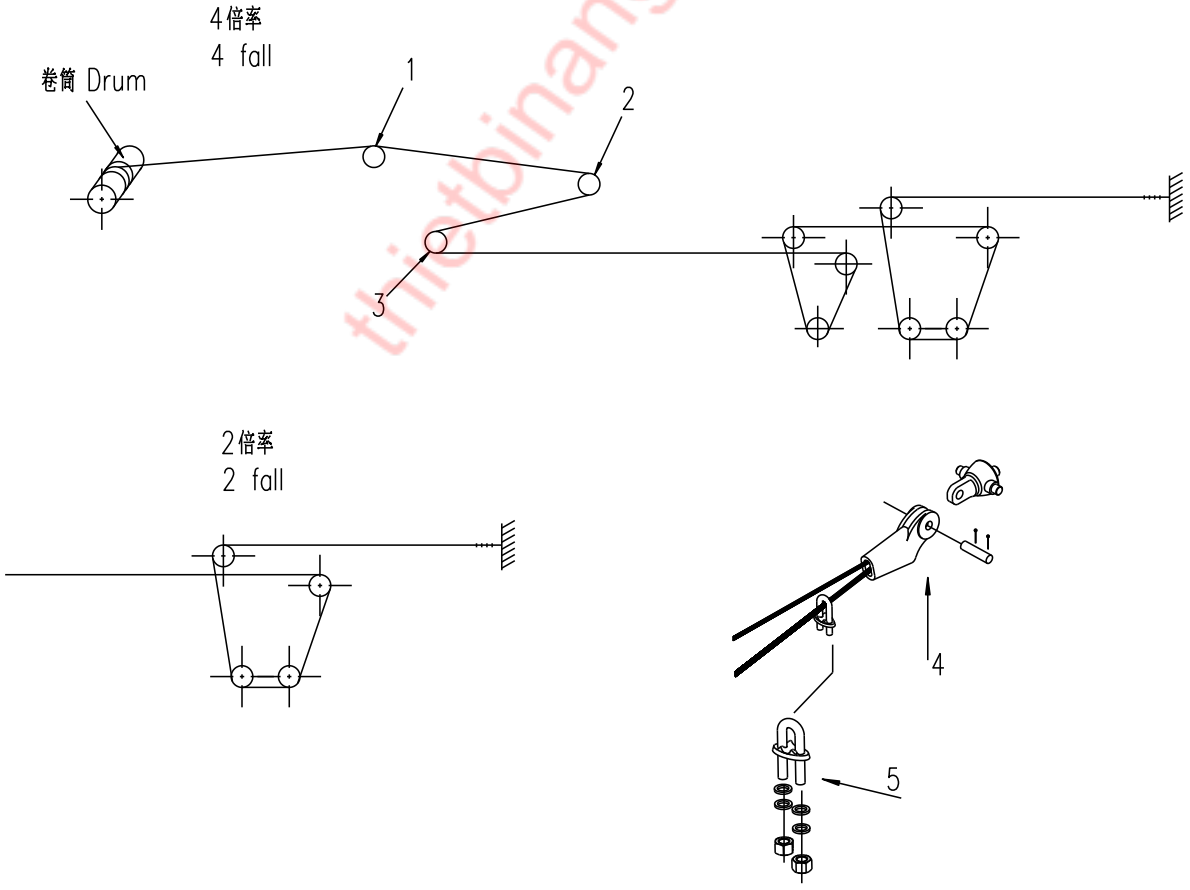


图 4-39 起升钢丝绳的穿绕 Fig. 4-39 Reeving The Hoist Rope

4.14 安装平衡重 Ballasting Installation

4.14.1 引言 Introduction

安装配重有两种方法：

There are two possibilities:

a.按说明，使用汽车吊安装配重。

Using a mobile crane according to the instruction

b.通过适当的钢丝绳穿绕方法，使用起升机构安装配重，见说明。

By means of the hoist winch with an appropriate rope reeving system, see instruction on page .

在用汽车吊安装塔机后，如果汽车吊必须离开现场或平衡臂后面不能进车，则可采用第二种方法（b）。

The second method （b）can be applied after an erection with a mobile if latter must be released or if the access to the rear the counter-jib is not possible.

值得注意的是：使用起升机构吊装配重需要将塔机接通电源，即：所需电源已在现场接通。

It is to be noted that lifting the ballast with the hoist winch requires the crane to be connected electrically, i.e/that the recommended electric power is already installed on the site.

另外，假如起升钢丝绳仍存在绳筒上，可在安装平衡臂之前将钢丝绳全部缠绕到起升卷筒上，这样就减少了钢丝绳的穿绕时间，尤其是在最后时刻才发现，配重必须以这样方式吊装时，事先在起升卷筒上卷好钢丝绳就更为必要。

On the other hand, if the hoist rope was stored on a reel, it is recommended to wind it completely onto the rope, especially if it has been found in the very last moment that the ballast must be raised in this manner.

吊装配重前，要检查配重块的总重量和尺寸规格，一定要符合有关要求，地面上如缺乏检查，将它们装到平衡臂上时就会有危险。

BEFORE FITTING make sure that the types, the total weight and the dimensions of the block correspond to the respective prescriptions. FOR LACK OF CHECKING ON THE GROUND you risk incidents when engaging them into the counter-jib.

4.14.2 用汽车吊安装配重 Fitting the ballast using a mobile crane

折下装在平衡臂头部的锁杆(1)，按安装顺序将配重块摆放好，使用带有销轴(2)的吊索(3)提起第一块配重至配重支架(4)的水平位置，并将其置于上横梁之间（如图 A 和 B 所示）。将销轴(5)和附件(6)连接，然后落下配重块，使销轴插入其支撑架(7)，如图 C 所示，在吊装过程中，应避免配重块将平衡臂顶起，否则很危险。

Remove the locking bar (1) located at tile counter-jib nose. Position the ballast blocks in their fitting order Using sling (3) fitted by shall (2) raise the first block up to the level of the ballast support (4). Engage the block between the upper beams as shown in Fig. A and B. Pin the shafts (5) on the attachments (6),then lower the block so that the shafts engage into their supports (7) as shown in detail C. During this operation, check particularly that the block does not press under the counter-jib thus risking to lift it up.

其他配重块也以同样的方式进行安放，全部配重块装毕后必须将它们锁在一起。将拉杆(9)穿过配重块上的孔，再将止动垫板(8)套在拉杆上。这样固定止动垫板可将拉杆转动 1／4 圈。在里侧可将止动垫板(10)与配重支架连接。用 2 个螺母(11)将整个组件锁紧，详见图 D. 整个配重装配过程是在通道（12）上进行的，最后重新装上锁杆(1)。

Proceed in the same manner for the other blocks. As soon as all the blocks are fitted, they must be locked together. To do this, slide the fixing rods (9) through the holes of the blocks. Introduce the forks (8) onto these rods and place them into the holes provided for this purpose Then carry out 1/4 turn with the rods so as so block the forks. On the inside, engage the fork (10) into the ballast support and lock the whole assembly using 2 nuts (11) as shown in detail D. All the ballasting

sequences are carried out from the cat walks (12). Re-fit the locking bar (1).

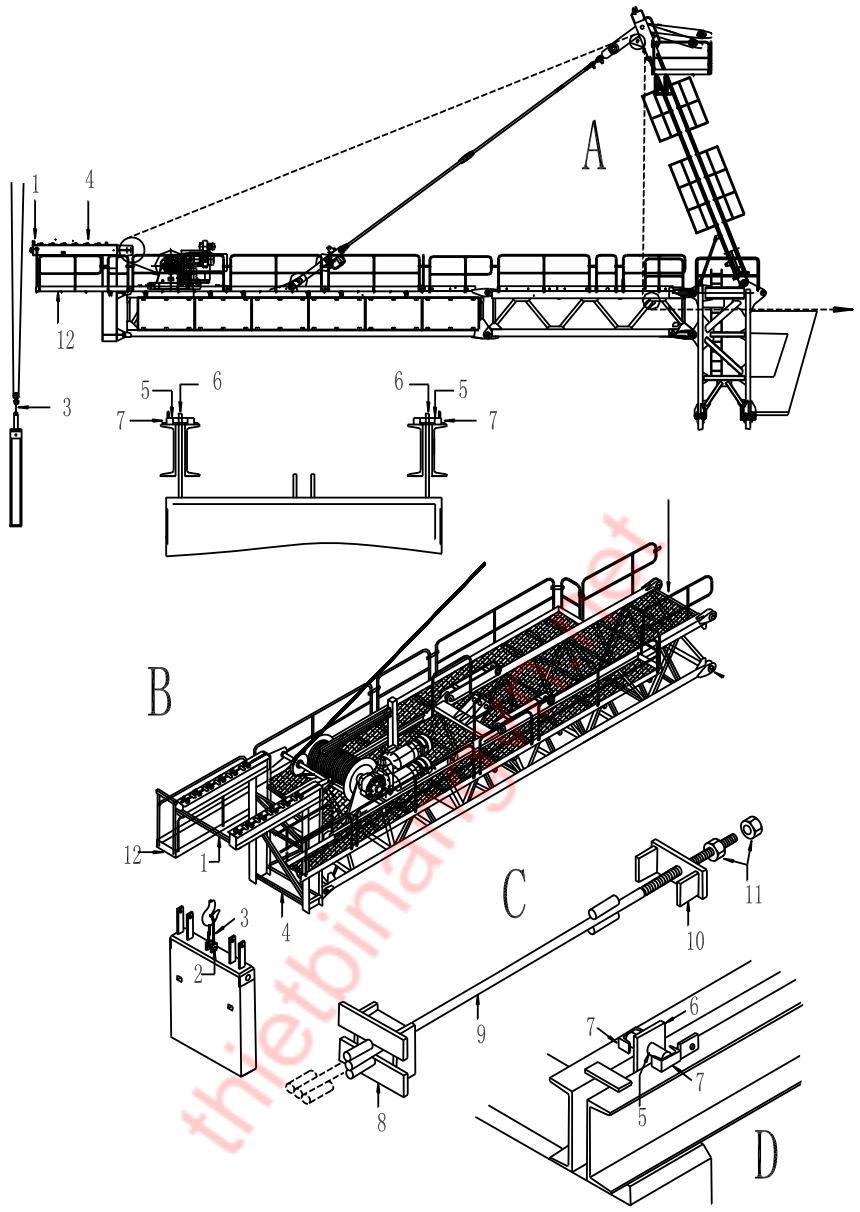


图 4-40 安装配重 Fig. 4-40 Ballasting installation

4.14.3 用起升机构安装配重 Fitting the ballast using the hoist winch

将配重块摆放在平衡臂下面，安装配重起升横梁（1）并用两根销轴（2）将其锁固（见图 A 和 B）。

Position the ballast blocks under the counter-jib.Fit the ballast lifting beam (l) and lock it by means of two shafts (2) (Fig. A and B).

A—第一步穿绕起升钢丝绳，放开钢丝绳将其穿过滑轮（3）、（4）、（5）、（6），用钢丝绳楔套（8），再用销轴（9）将钢丝绳尾端在（7）的位置上固定在提升横梁上。

A—Reeving the hoist rope. Unwind the rope, run it over the pulleys (3), (4), (5),(6) and by means of a rope anchor box (8), pin it at (7) onto the lifting beam using shaft (9).

B—第二步提升配重，使用起升卷扬放下提升叉（10），用一根销轴（11）将其与第一块配重连接，并将其提升到配重支架的水平位置，有安装人员在通道（12）上进行导引，并将其固定（如图 B）所示用两根销轴（13）插好后放下配重，使销轴与支架（14）连接，如图 C 所示。

B— Raising the ballast. By means of the hoist winch, lower the lifting fork (10) and fit it using 1 shaft (11) onto the first block. Raise the block up to the level of the ballast support and engage it (as shown in Fig. B) by guiding the block from the cat- walks (12). Pin the 2 shafts (13), then lower the block so that the shafts engage into their supports (14) as shown in detail C. During this operation, cheek particularly that the block dose not press under the counter-jib which could cause anomalous forces in the crane structure.

在安装过程中，要特别注意勿使配重块在下面挤压平衡臂，否则会在塔机结构上产生附加反力。以同样的安装方法吊装每一块配重，一旦全部配重安装完毕，即可用一根拉杆（16）穿过每一块配重的孔，将它们连接在一起，用止动垫板（17）与配重支架相连，最后使用 2 个螺母（18）将整个组件锁固，如图 D 所示。

Displace the lifting beam and carry out the same operation for each block. As soon as all the blocks are fitted, they must be locked together. To do this, slide the fixing rods (16) through the holes of the blocks. Introduce the forks (15) onto these rods and place them into the holes provided for this purpose. Then carry out 1/4 turn with the rods so as to block the forks. On the. Inside, engage the forks (17) into the ballast support and lock the whole assembly using 2 nuts (18) as shown in derail D.

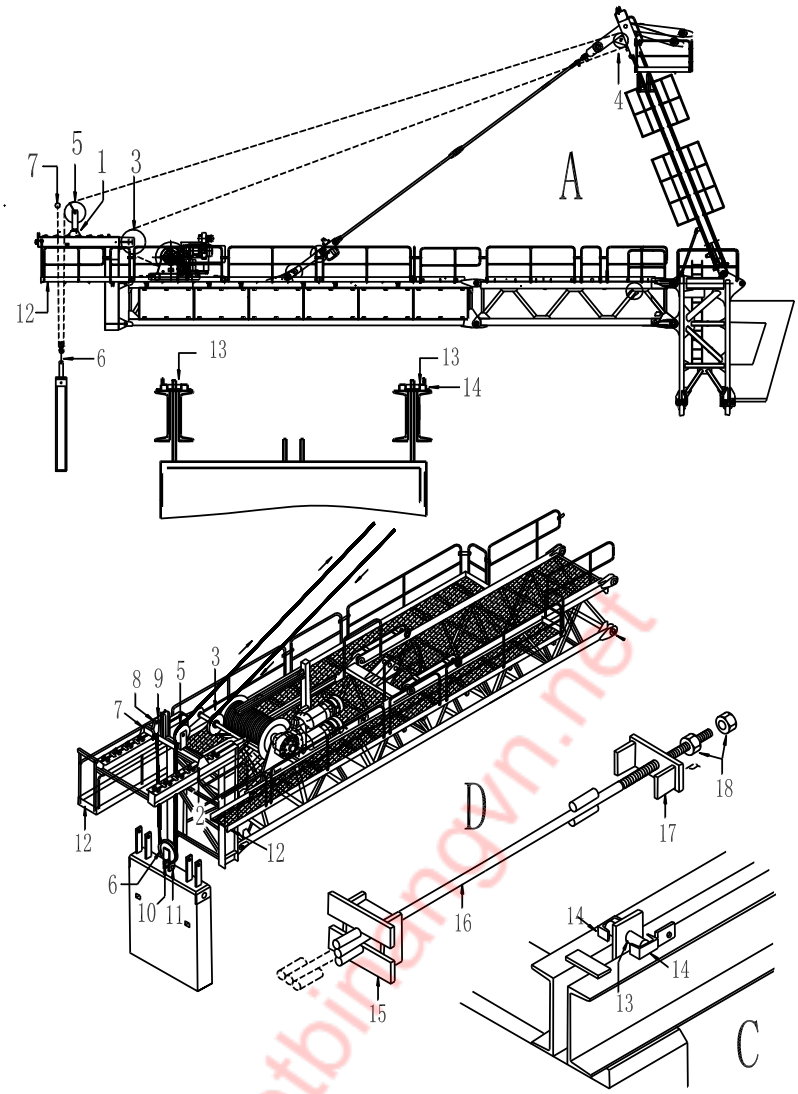


图 4-41 安装配重 Fig. 4-41 Ballasting installation

4.15 塔身组成 Mast compostion

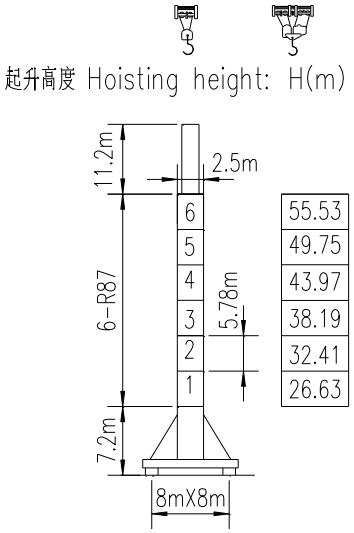


图 4-42 塔身组成 Fig. 4-42 Mast compostion

每个塔身分两片吊起，并按照备用件手册装置。

Each mast section will be raised in two elements and assembled according to the Spare Parts Brochure.

根据所提供的相应图示，把平台和扶梯装配在其中一个塔身片的相应位置。

Equip one of the elements with its platform and ladder according to the figure opposite.

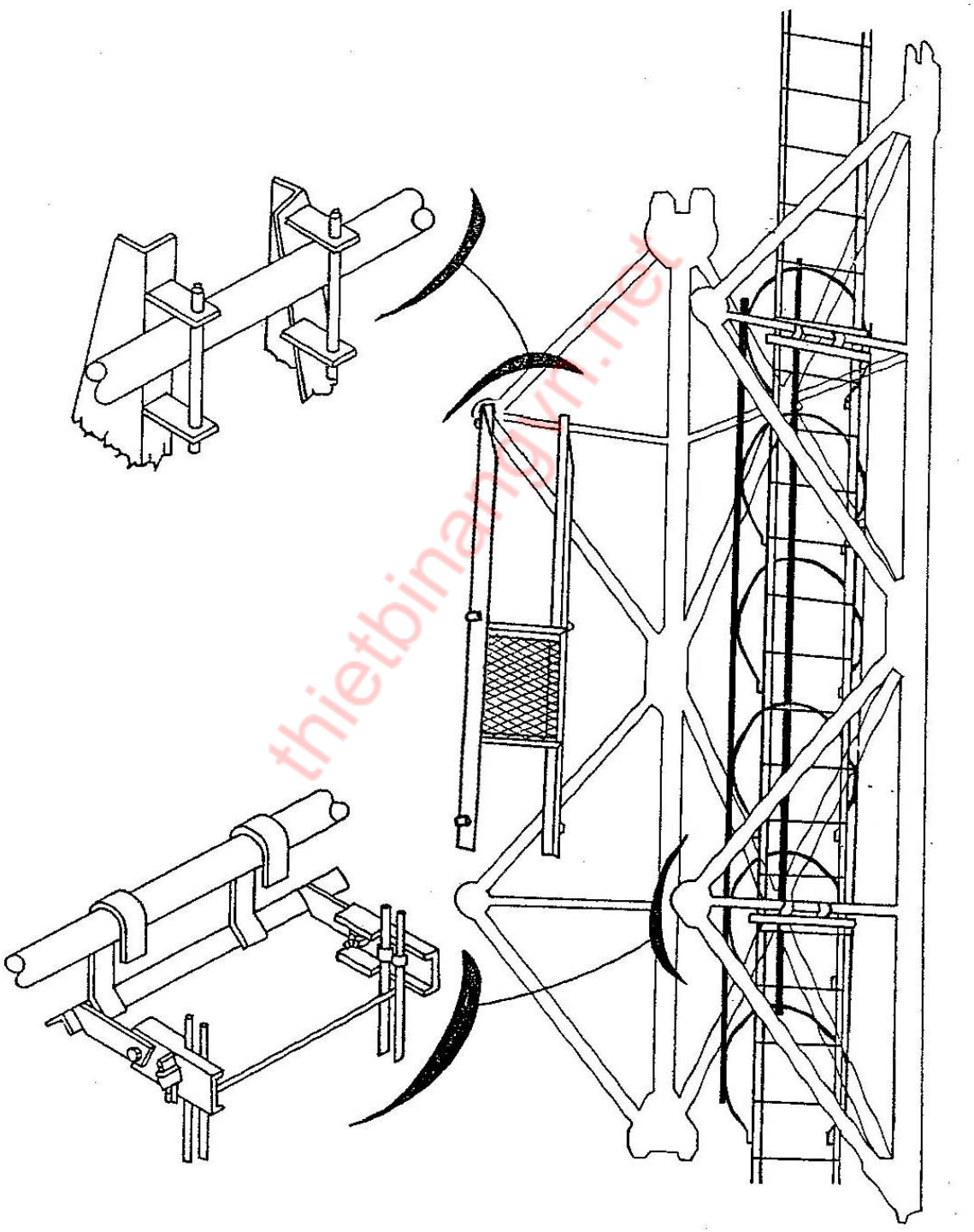


图 4-43 塔身组成 Fig. 4-43 Mast compostion

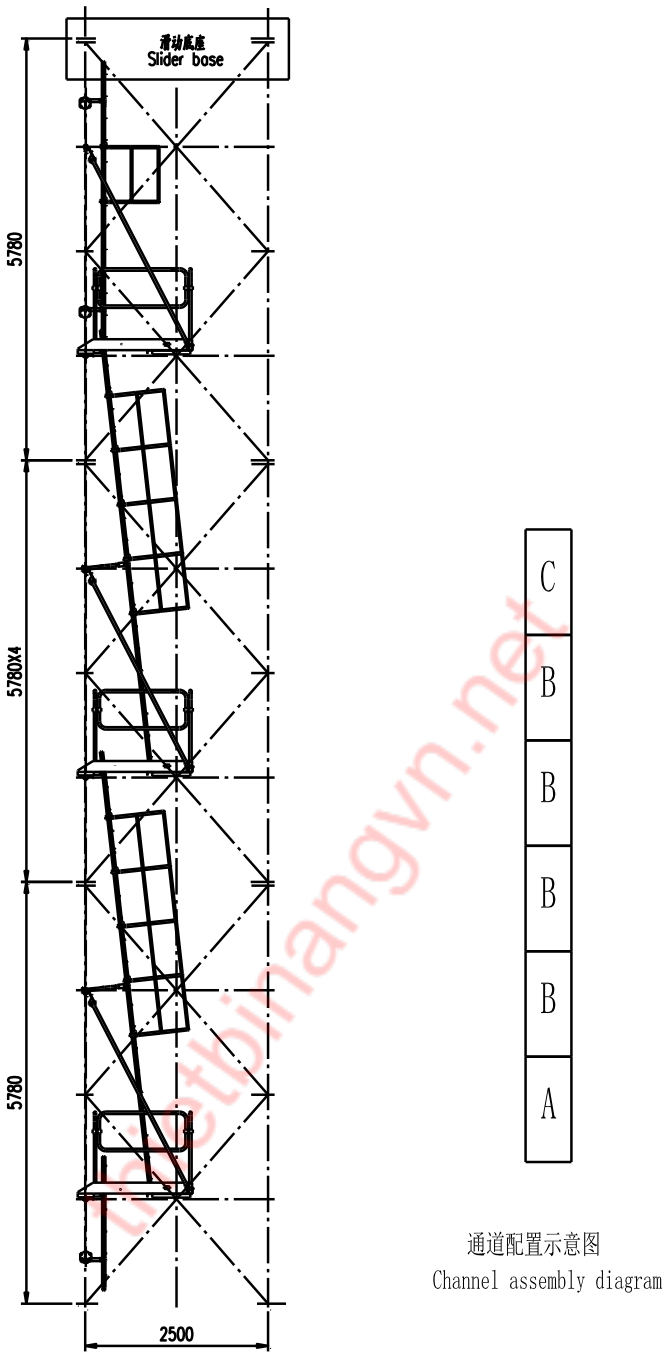


图 4-44 通道组成　Fig. 4-44 Channel assembly

4.16 顶升 TELESCOPING

4.16.1 特别说明 Special instructions

为了避免事故发生，保证塔机的安全，顶升操作时必须严格遵照以下操作：

In order to avoid accidents, telescoping operations ust be carried out in accordance with the instructions given. On the following pages and it is imperative to abide by the instructions below.

—**禁止**转动起重臂

—**禁止**移动变幅小车

—**禁止**顶升时吊钩进行任何起升或下降操作。

It is **forbidden:**

—To slew the jib

—To move the trolley

—To carry out any hoisting or lowering manipulation when the telescoping assembly is raised or during raising.

停止顶升必须具备下列条件：

Conditions to be maintained for interrupting a telescoping operation:

a) 固定滑动底座

Slide shutters pinned.

固定好装配好的标准节

Mast sections assembled and pinned.

拧紧滑动底座的高强螺栓

Pressure screw of the shutters blocked.

套架脱离塔身上升，并用小轭固定在爬升梯上

Cage lifted off of the mast and pinned on the telescoping ladder by means of the small yoke.

b) 滑动底座用销与塔身固定

Slide shutters pinned.

拧紧滑动底座的高强螺栓

Pressure screw of the shutters blocked.

套架脱离塔身，并借助套架的固定点与爬升梯连接

Cage lifted off of the mast and resting on the telescoping ladder by means of the fixed point of the cage.

当不顶升时：When not telescoping:

不能忘记顶升装置应用油缸支撑，滑动底座必须固定好。

Never leave the telescoping assembly supported on the cylinder, the slider must always be pinned by its shutters.

不能将塔身片悬挂在套架上

No mast section must be suspended on the cage derricks.

转臂吊杆锁定位置

Hanged bar must be locked at a position.

只能在风速小于 60km/h 时才能顶升

Telescoping can only take place if the wind speed is less than 60 km/h

回转支承以上部分用外形轮廓表示

The part above the slewing ring is represented as an outline.

4.16.2 顶升装置 Telescoping assembly

顶升装置有两部分组成，一部分是一直装在塔机上，另一部分仅是在顶升时使用。

The telescoping assembly is composed of main parts remaining on the crane and of a certain number used solely during telescoping.

安装顶升装置，有三种情况：

There are three scenarios for installing a jacking device:

①在正常立塔期间，安装整个顶升装置

Fitting of the complete assembly during normal erection of the crane.

②增加高度时部分安装

Partial fitting for height increase.

③拆塔时部分安装

Partial fitting for dismantling the crane

下页将描述在正常立塔之后顶升装置的安装。

The following pages describe the fitting of the telescoping assembly after normal erection of the crane.

安装顶升装置 Fitting the telescoping assembly

为装配顶升装置主要部分，可详阅相应的备用件手册。

For assembling the main telescoping elements refer to the detailed brochure on the corresponding spare parts.

为安装顶升装置的各部件，可查阅《安装顶升套架》。

In order to fit the elements which comprise the telescoping assembly, refer to the brochure on < Fitting the telescopic cage >

4.16.3 顶升配平 Balancing when telescoping

为确保顶升操作能顺利进行，配平塔机是安全必要的。

So that telescoping operations can be carried out under good conditions, it is necessary that the crane is perfectly balanced.

塔机配平分两种方式来完成：This balancing is carried out in two phases :

①在起重臂下悬吊一载荷，此载荷的重量和理论上的悬吊距离在后面的图表中给出，悬吊距离是从塔身轴心线量至吊载中心线，其大小取决于起重臂长度和平衡块的实际重量，要注意吊载大小应与起重臂的长度相匹配。

By suspending the load under the jib whose weight and theoretical distance are given in the table on page. This distance, measured from the crane axis to the load axis dependent upon the length of the jib and the actual weight of the counter-jib ballast. Ensure that the weight is well adapted to the lengths of jib.

②通过移动起重小车来配平，起重小车的准确位置由检查液压系统压力表度数处于最小值状态即可，记下此时起重小车在起重臂上的位置。

By Moving the trolley in order to perfect the balancing. The exact position of the trolley will be found by checking the minimum pressure necessary for telescoping on the manometer of the hydraulic ground. Mark this position on the jib.

平衡位置（简图）

Balancing positions (chart)

122LVF40NB

起重小车吊载(4 绳) Jib trolley with load (4 fall)

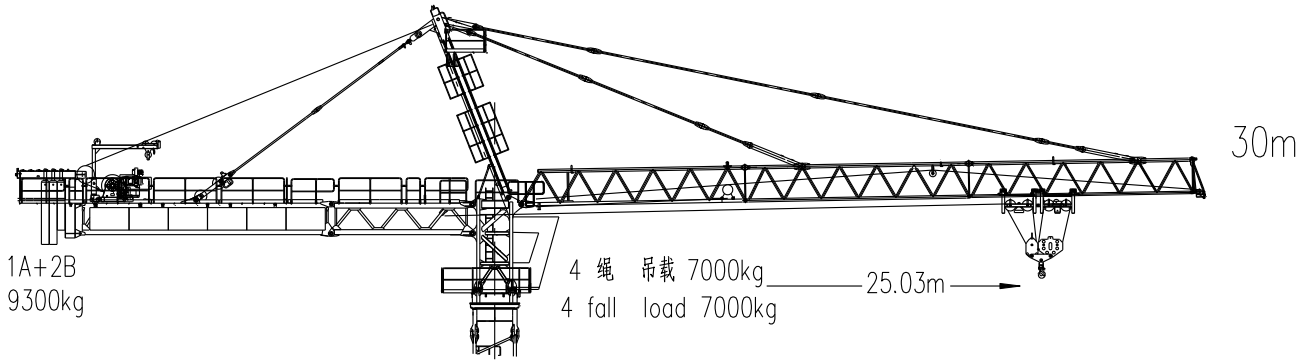


图 4-45 平衡位置 Fig. 4-45 Balancing position

4.16.4 顶升 Telescoping

在初始安装高度下的塔机安装好后，将滑动底座连接在固定支脚上，套架鱼尾板用销轴固定在塔身上，同时油缸回缩。

After fitting of the basic crane, the slider is supported on the lugs of the basic mast unit of the fixing angles, the cage fish-plated and pinned on the mast and the cylinder retracted.

通过逐次油缸收缩顶升滑动底座，滑动底座连接处能用销轴连接在塔身顶部，这点是必要的。

It is necessary therefore to telescope the slider by successive cylinder strokes until the shutters of the slider base can be pinned to the top of the mast.

为此：

For this:

取下起重吊钩，用滑轮组轭架替换。

Remove lifting hook and replace with pulley block yoke

用相应的吊载配平起重机。

Balance the crane by means of corresponding load.

检查套架连接处销轴（1）应缩回。

Check that shaft (1) of the cage’s fixed point is retracted.

推出横梁上的销轴（2），使之连接到顶升爬梯（3）上（见详图 A）。

Push out the yoke shaft (2) and make it come to rest on the telescoping ladder (3) (Detail A).

油缸完全地伸到最大行程。

Completely extend the cylinder.

推出套架连接处的销轴（1）。

Push out shaft (1) of the cage’s fixed point.

使爬升梯运动到能连接销轴（1）。

缩回横梁销轴（2）。

Retract the shaft (2) of the yoke (Detail B).

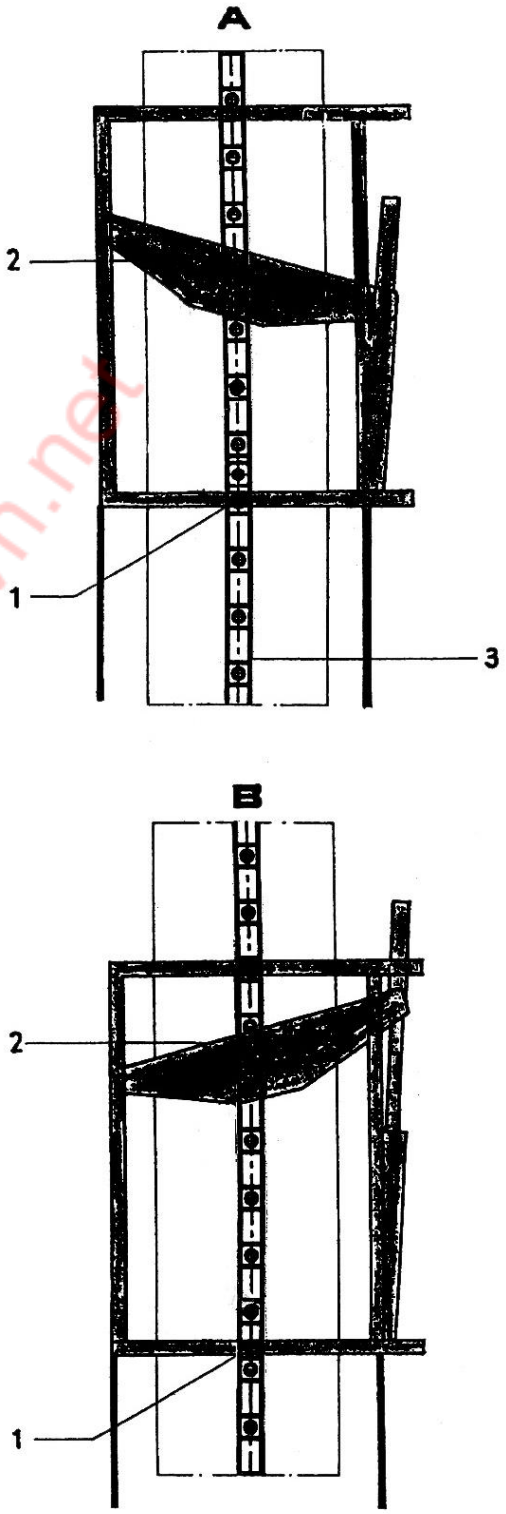


图 4-46 顶升 Fig. 4-46 Telescoping

顶升加节 Telescoping

缩回油缸。

Retract the cylinder.

在完全缩回油缸后，推出横梁销轴（2），缩回销轴（1）（详图 A）。

After complete retraction of the cylinder, push out the shaft (2) of the yoke and yoke an retract the shaft (1) (Detail A).

完全伸出油缸。

Completely extend the cylinder

继续上述操作，直到支腿能转回，并能用销轴将滑动底座和塔身连接起来为止。

Continue the operation until the shutters can be turned back and pin the slider base to the mast.

打开支腿（4），用销轴把他们连接到塔身上（详图 B）。

Open the shutters (4) and pin them to the mast (Detail B).

此时，滑动底座完全不能运动。

The slider is now completely moved out.

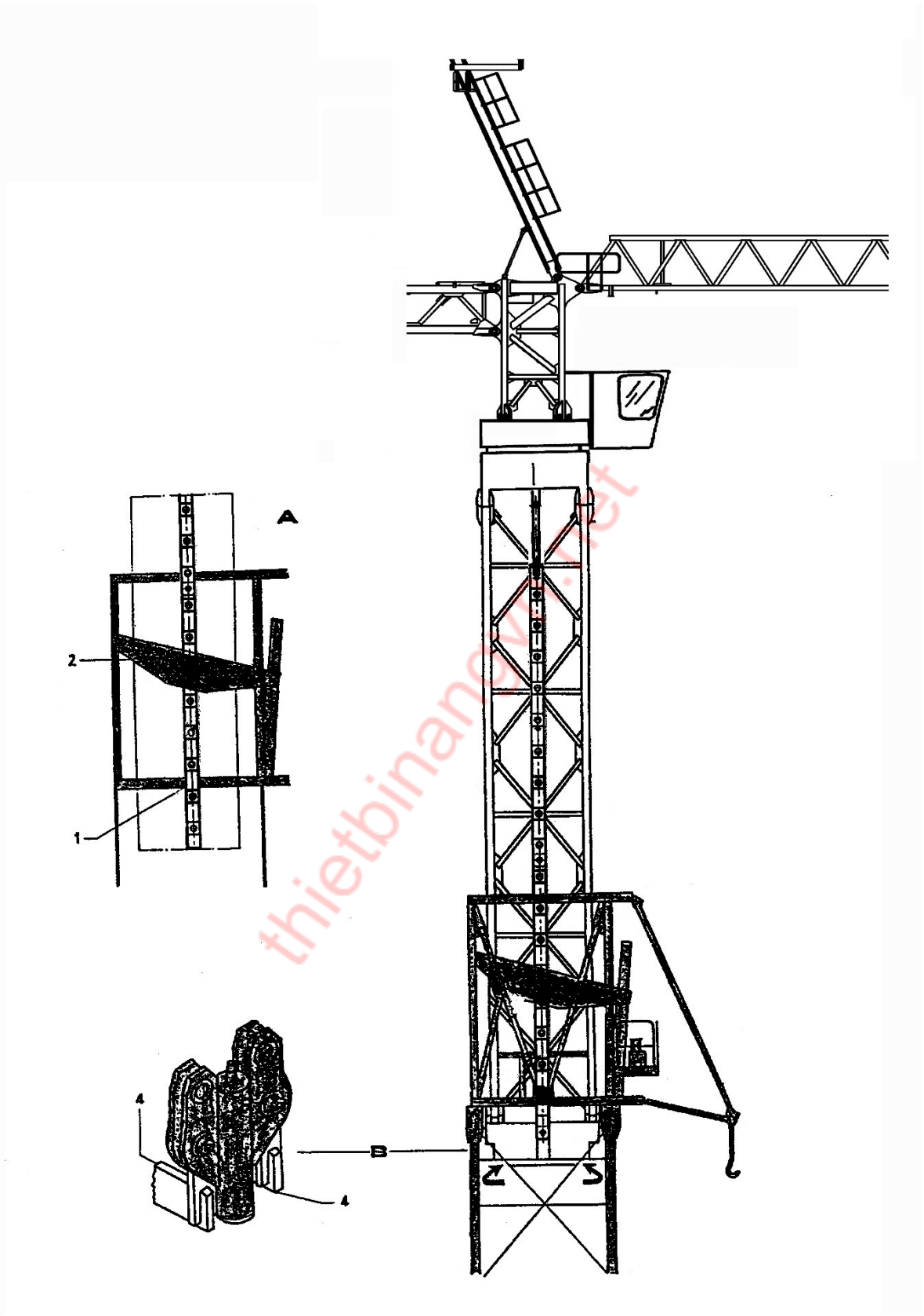


图 4-47 顶升 Fig. 4-47 Telescoping

顶升加节（续）Telescoping(con't)

取出套架和塔身的连接销轴（5）

Withdraw the cage and mast pinning shafts (5).

通过油缸将套架从塔身鱼尾板连接处顶出。

Disengage the cage from the mast fishplates by means of the cylinder.

把配平负载放到地面上。

Place the balancing load on the ground.

通过套架上的摇臂吊杆把套架吊在滑轮组轮架上。

Suspend the cage by its derricks on the pulley block yoke.

注意：用人字转臂上的安全装置锁住人字转臂支座。

Attention: Lock the yoke on the derricks by means if the safety system situated on the derricks arms.

缩回套架固定处的销轴（1）和轭梁处销轴（2）。

Retract the shaft (1) of the cage's fixed point and the yoke pinning shaft (2).

在提升套架前，应让叉臂（7）水平定位。

Before raising the telescopic cage, position the yokes (7) horizontally.

用起重吊钩，提升套架（6）。

By means of the crane's hook, raise the telescopic cage (6).

用销轴（8）将小支承座（7）连接在爬升梯（3）上。

Pin the small yoke (7) on the telescoping ladder (3) by means of shafts (8).

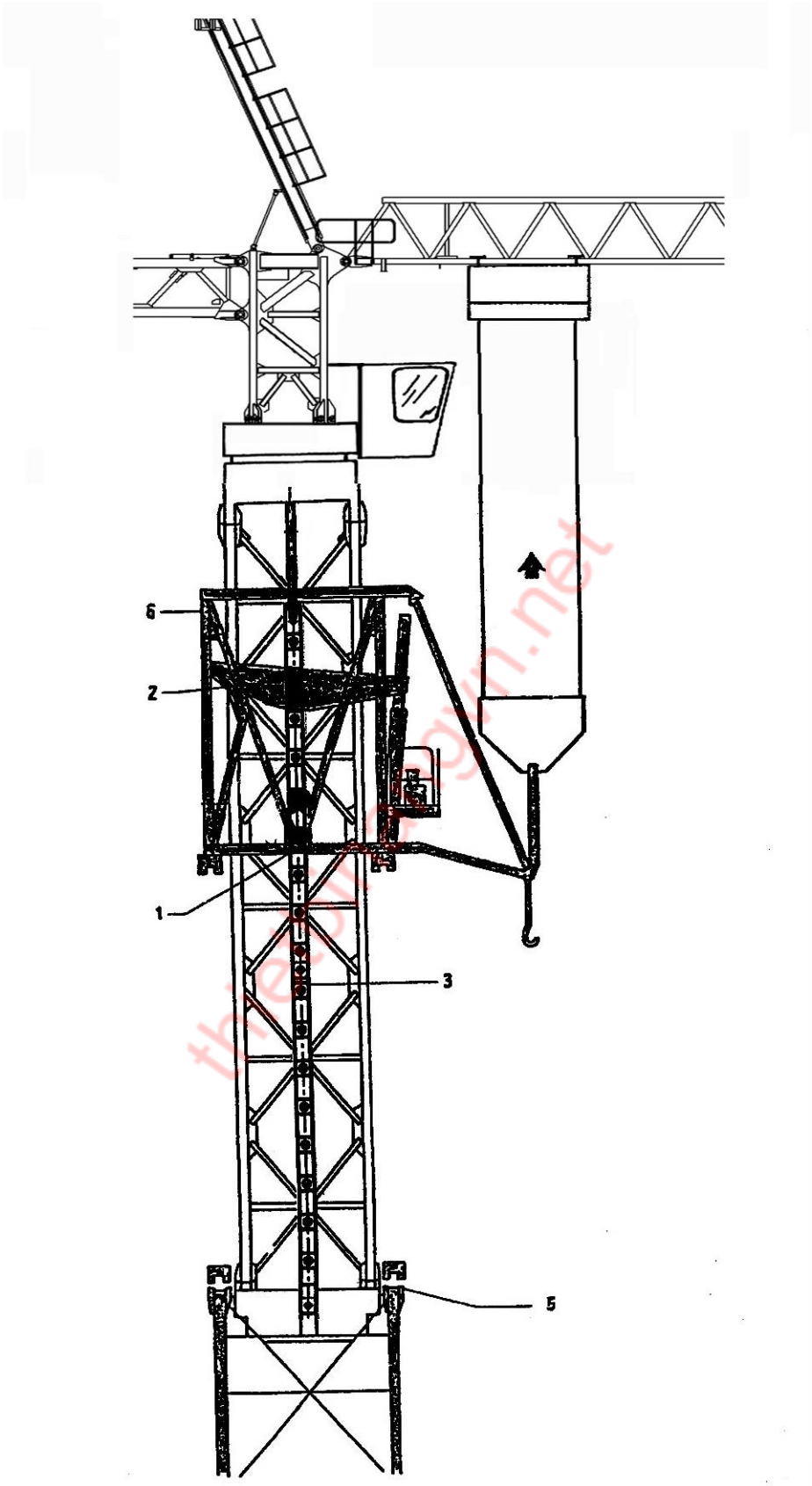


图 4-48 顶升 Fig. 4-48 Telescoping

顶升加节（续）Telescoping(con't)

慢慢地放下起重吊钩，以便让套架处于自由状态。

Slowly lower the hook of the crane in order to free the cage.

完全地伸出油缸。

Completely extend the cylinder.

套架上升到允许引入一个塔身标准节的距离。

The cage rises a distance of which permits the introduction of a mast section.

塔身标准节的装配，请查阅塔身和备用件手册。

For assembling the mast section, refer to the mast brochure and to the spare parts pages.

用滑轮组轮架装配好半个塔身标准节，并把它吊挂于套架人字转臂上。

By means of the pulley block yoke, fit to semi-mast section and raise it to the level of the cage derricks.

注意：将一个爬梯和一个平台装在半个标准节上，再把标准节吊挂在套架一个人字转臂之前，应注意低处塔身标准节爬梯的方位，以便从相应的方位吊起，并确保通道连续。

Attention: A semi-mast section is equipped with a ladder and a ladder and a platform. Before hanging it from one of the cage derricks, be sure to note the position of the ladder in the lower mast section in order to suspend it from the correct side and to ensure continuity of the accesses.

从已选好的一套架人字转臂上吊挂起半个塔身标准节（详图 A）,并重复进行另一边的操作。

Hang the semi-mast section from the chosen cage derrick (Detail A) and repeat the operation for the other half.

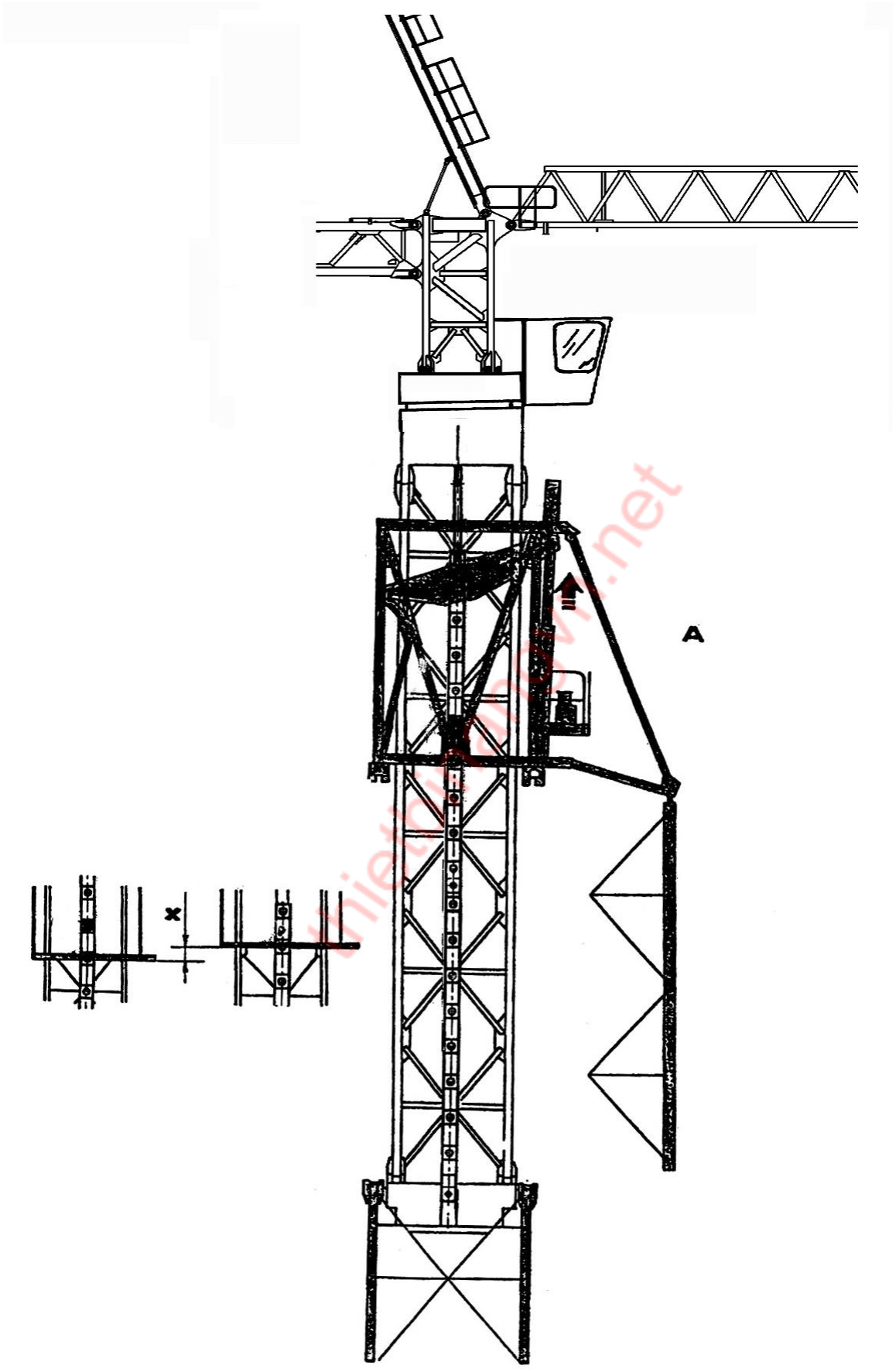


图 4-49 顶升 Fig. 4-49 Telescoping

顶升加节（续）Telescoping (con't)

把两个二分之一塔身标准节挂在套架上后，重新装上并吊起塔机配平负载。

The two semi-mast sections being hung from the cage, refit and lift the balancing load of the crane.

转动套架人字转臂，以便将两个二分之一塔身标准节放置在内塔身四周（详图 A）。

Make the cage derricks pivot in order to place the two semi-mast sections around the slider (Detail A).

用 4 个销轴（9）安装两个二分之一塔身标准节。

Assemble the two semi-mast sections by means of shafts (9).

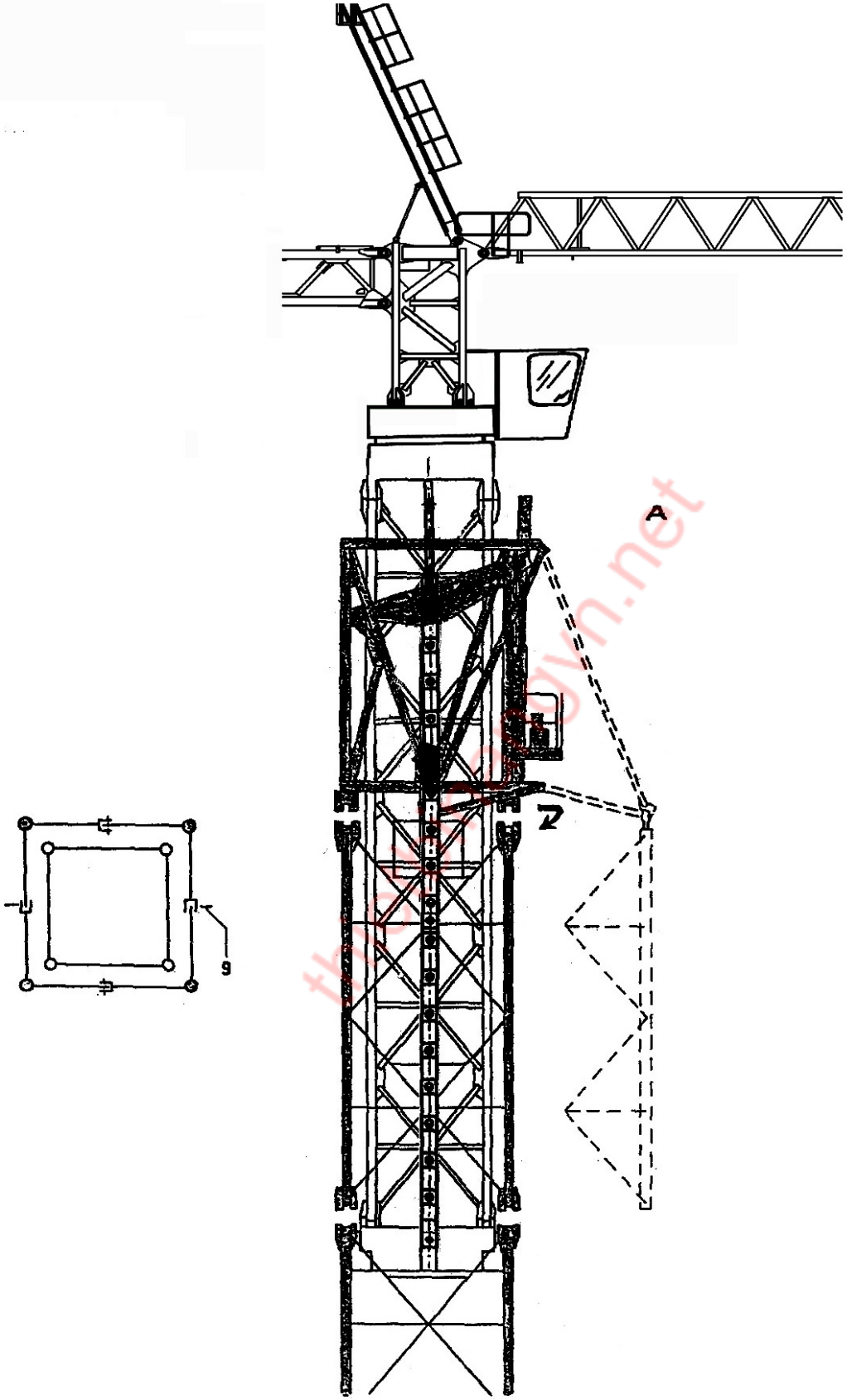


图 4-50 顶升 Fig. 4-50 Telescoping

顶升加节（续）Telescoping (con't)

缩回油缸，以便使塔身标准节落入低处塔身标准节鱼尾板中。

Retract the cylinder in order to engage the mast section in the fishplates of the lower mast section

装上鱼尾板销轴。

Fit the fishplate shafts.

继续缩回油缸，以便套架能落入在刚安装好的塔身标准节上。

Continue to retract the cylinder in order to engage the cage on the level of the mast section already fitted.

装上有间隙的销轴。

Fit the shafts with play.

取下小支座（7）与爬升梯（3）的连接销轴。

Unpin the small yoke (7) of the telescoping ladders (3).

重复顶升操作，直到塔身标准节都被顶升完毕。

Carry out the telescoping operations once again, as many times a there are mast sections to the telescoped.

最后一个塔身标准节安装好后，继续顶升操作，以便能将滑动底座的支腿与塔身标准节的鱼尾板用销轴连起来。

The final mast section having been fitted continue with operations in order to the able to pin the shutters of the slider base to the upper fishplates of the mast section.

用标准的鱼尾板销轴把滑动底座连接在最后一个塔身标准节上。

Pin the slider on the final mast section by means of standard fishplate shafts.

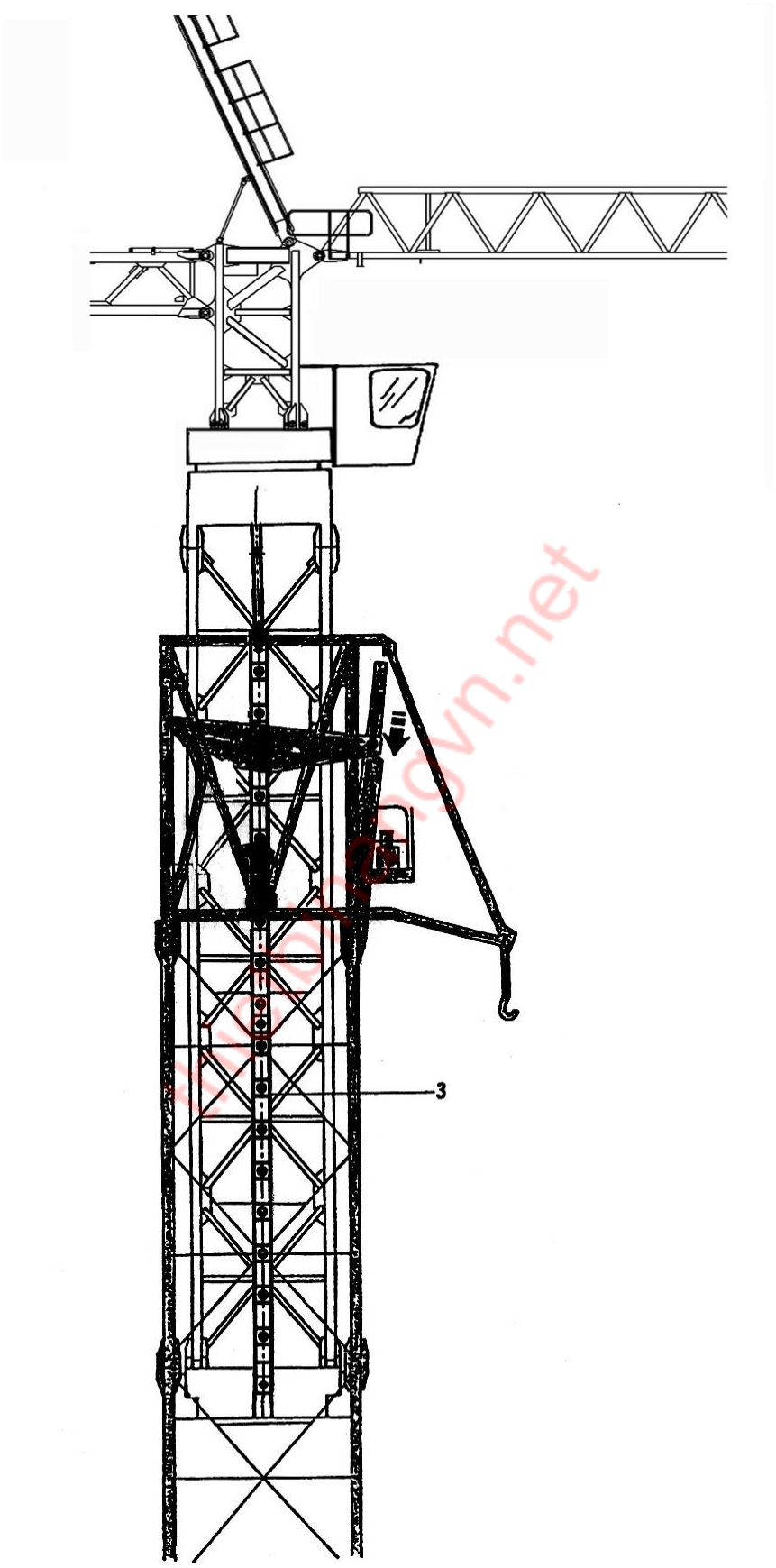


图 4-51 顶升 Fig. 4-51 Telescoping

顶升加节（续）Telescoping (con't)

用油缸将套架从塔身鱼尾板中顶出。

By means of the cylinder, disengage the cage from the mast fishplates.

用螺栓（11）和能游动的销轴（12），把连接滑动底座和塔身标准节的承载板（10）装上。

Fit the link which takes up the stresses (10) connecting the slider base to the mast section by means of the bolts (11) and the shafts with play (12).

操作拧紧装置给螺栓施加预紧力。

For pre-stressing the bolts with controlled tightening.

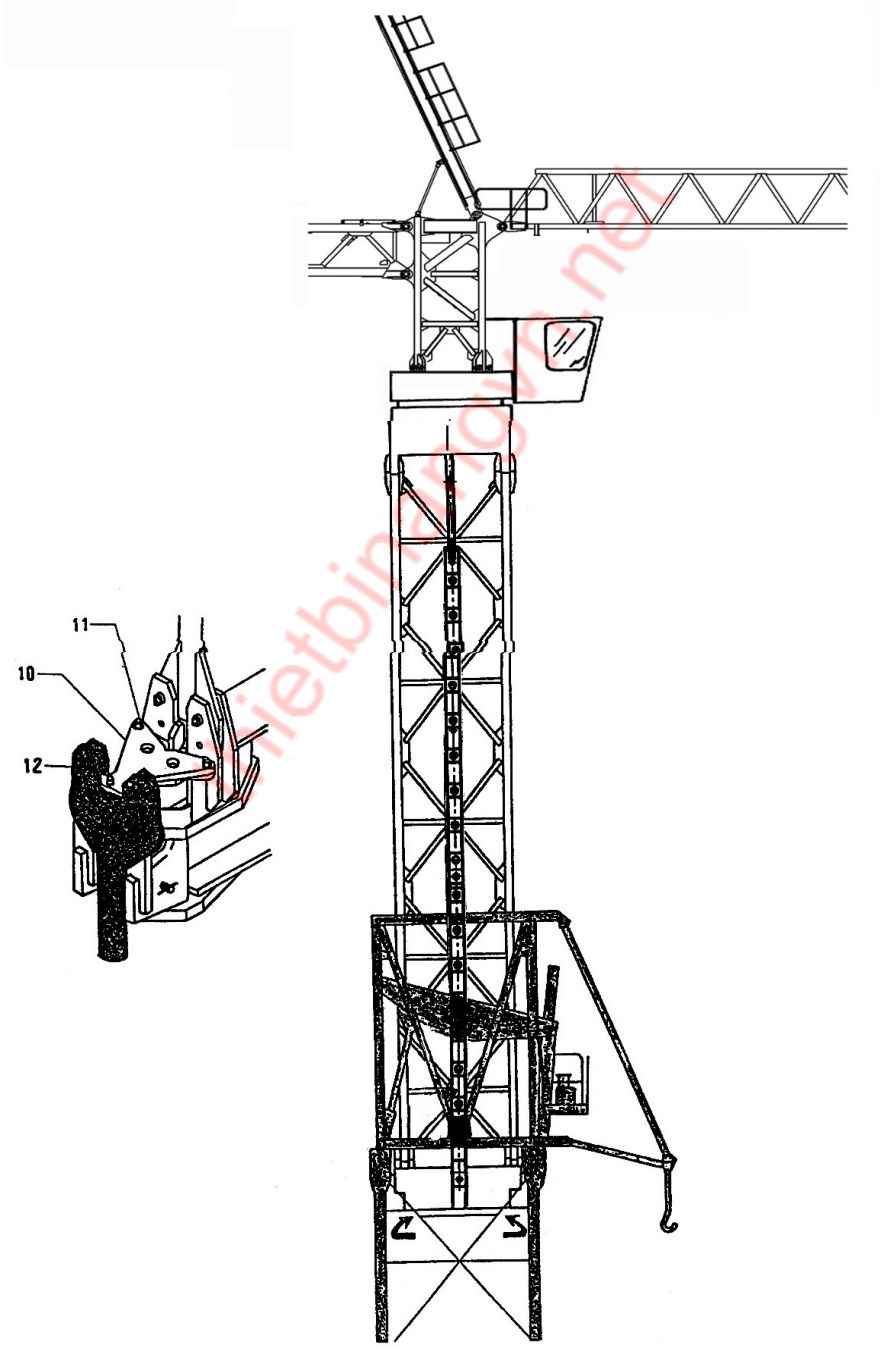


图 4-52 顶升 Fig. 4-52 Telescoping

4.16.5 预紧油缸 Cylinder for pre-stressing

油缸组成：

This cylinder comprises:

一个连有一个压力表（序 2）和一根软管（序 3）的手控液压泵（序 1）。

A manual hydraulic pump (mark 1) Equipped with a manometer (mark 2) and a hose (mark 3).

一个联轴器（序 4）。

A coupling (mark 4).

一个管套（序 5）。

A socket (mark 5).

一个液压推杆组件（序 6）。

A cylinder rod assembly (mark 6).

一个液压站（序 7）。

A cylinder body (mark 7).

两个滚花螺母（序 8）。

Two knurled nuts (mark 8).

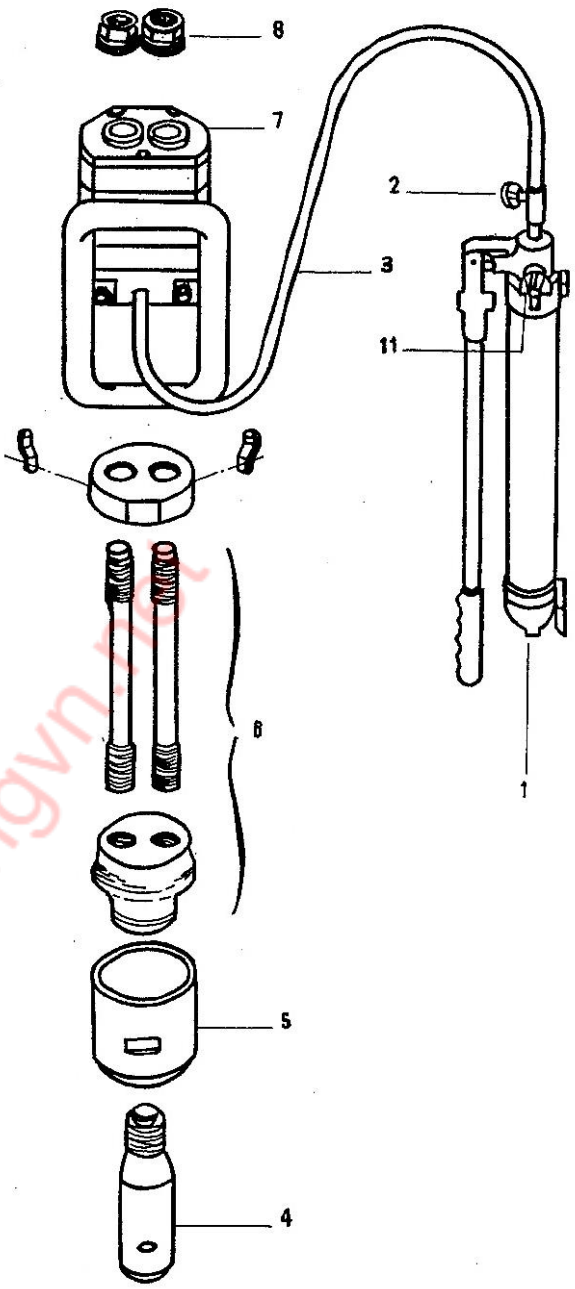


图 4-53 油缸 Fig. 4-53 Cylinder

预紧油缸的使用 Use of the cylinder for pre-stressing

方法：MNAOEUVER:

把管套（序 5）放在须张紧的连接处。

Place the socket (mark 5) on the link which takes up the stresses (mark 9).

把联轴器（序 4）上旋紧液压推杆组件（序 6）。

Screw up the cylinder rod assembly (mark 6) on the coupling (mark 4).

把液压站（序 7）放在推杆组件上，如果安装有困难，两根推杆可先不旋转，等液压站放入后，再将两根推杆旋紧。

Position the cylinder body (mark 7) on the rod assembly. If fitting is difficult, the two rods can be unscrewed and refitted when the cylinder body is position.

沟槽 G1（详 A）须正好露出，否则，液压泵应来回泵油若干次直到沟槽 G1 正好露出为止。

Groove G1 (Detail A) must just appears. In the opposite case, carry out several pumping movements until it appears.

旋紧螺母（序 8），但不要太紧。

Screw up the nuts (mark 8), but not too tightly.

泵站直到获得所需压力。

Pump until the pressure required is obtained.

预紧力：36 t（约合 500 bar）。

PRE-STRESSING PRESSURE:36t(500 Bar).

注：此压力应根据实际使用的预紧油缸的活塞面积计算而得。

Note: This pressure should be calculated according to the actual piston area of the pre-loaded cylinder

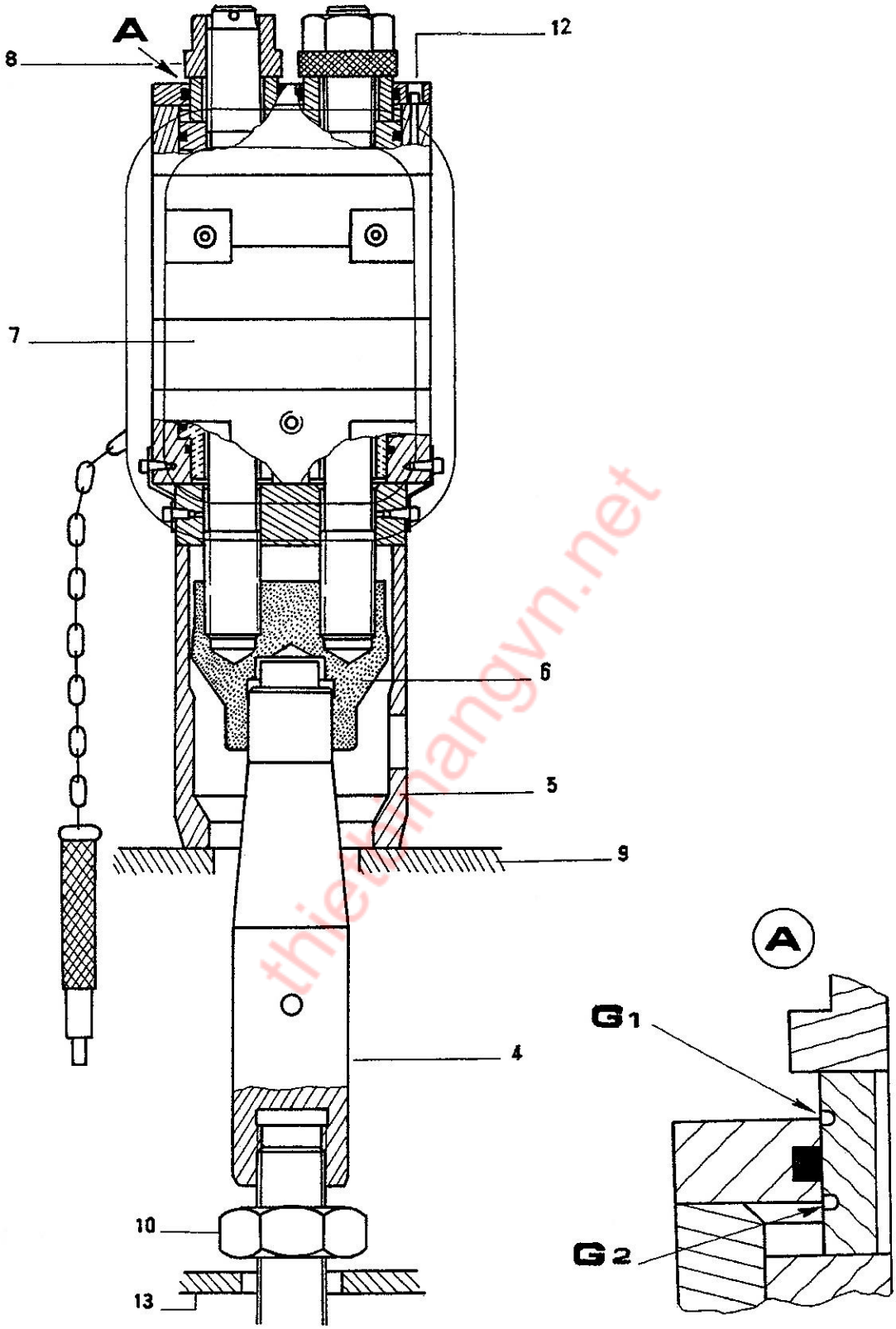


图 4-54 油缸 Fig. 4-54 Cylinder

预紧油缸的使用（续）Use of prestressing cylinder (cont'd)

注意：活塞环沟槽 G2（详图 A）可到达液压站的上平面，但切勿超过上平面。如果再所需压力获得前，活塞环沟槽 G2 露出来了，按下列步骤操作：

CAUTION: The piston ring groove G2 (Detail A) may reach the upper level of the cylinder body but must not exceed it. If the piston ring groove G2 appears before the required pressure is obtained, proceed as follows:

用手旋紧螺母（10）,使它压紧垫圈（13）。

Screw up the nut (10) by hand, in order to permit contact with the washer (13).

拧紧旋扭（11），压力恢复到零。

Bring back the pressure to zero by unscrewing the pump screw (11).

旋紧两个螺母（8）直到活塞环沟槽 G1 正好可见。

The two nuts (8) until the piston ring groove G1 is just visible.

拧紧油泵旋扭（11）。

Screw up the pump screw (11).

泵油直到获得所需压力。

Pump oil until desired pressure is obtained.

用手旋紧螺母（10）,使它压紧垫圈（13）。

Hand tighten the nut (10) so that it compresses the washer (13).

拧松旋扭（11），压力恢复到零。

Bring back the pressure to zero by unscrewing the pump screw (11).

拧松螺母（8），退开液压站（7），拧松活塞推杆组件（6），并退开力偶杆（5）。

Unscrew the nuts (8), without the body of the cylinder (7), unscrew the piston rod assembly (6) and withdraw the socket (5).

注意：如果泵数次运动，超过了所需的压力，则拧松旋扭（12）释放压力。

NOTE: If the number of pump movements, necessary to obtain the pressure becomes too great, bleed the apparatus by taking out the screw (12).

要经常检查校准压力表。

From time to time, check the calibration of the pressure gauge.

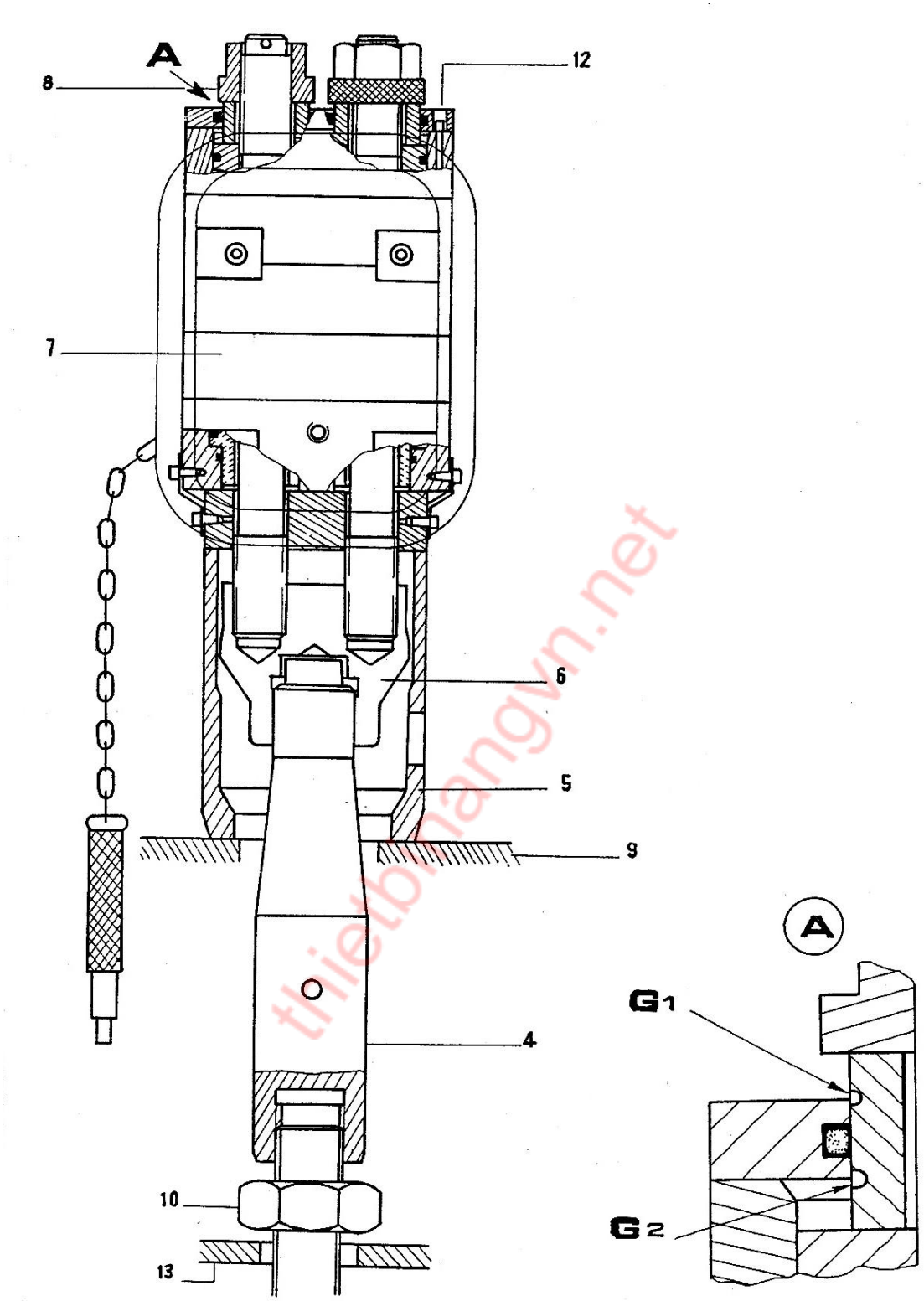


图 4-55 油缸 Fig. 4-55 Cylinder

4.16.6 拆卸套架 Dismantling the cage

图 A：

FIGURE A:

用销轴（2）将套架支承于顶升爬梯（1）上。

The cage is supported on the ladder (1) by means of shafts (2).

同样推出横梁销轴（3）。

Likewise push out the shafts (3) of thee yoke.

在上部顶升爬梯附近放置一根吊索，并把它固定到滑轮组架上。

Place a sling around the upper telescoping ladder and fix it to the pulley block yoke.

取出销轴（4）。

Unpin the shaft (4).

倾斜爬梯，并通过绳（5）把爬梯保持在适当位置。

Tilt the ladder and hold it in position by means of a cord (5).

在爬升梯底部安装一根调节绳（6）。

Fit a tirfor (6) at the bottom of the ladder.

取下销轴（7），逐渐把调节绳放长，当爬升梯到达垂直位置时，取下调节绳，将爬升梯下降至地面上。

Unpin the shaft (7) and pay out some of the Tirfor rope, as soon as the ladder arrives in the vertical position unhook the Tirfor and lower the ladder to the ground.

以相同方式继续拆卸在套架人字转臂上。

Proceed in the same manner for the other ladder.

图 B：

FIGURE B:

把滑轮组架安装在套架人字转臂上。

Fit the pulley block yoke on the cage’s derricks.

退出销轴（2）和（3）。

Exit pins (2) and (3)

吊起套架，并在四角处放置一根吊索。

Raise the cage and place a sling around the four corners.

吊索应能承受套架重量。

Allow the weight of the cage to be supported by the slings.

装上顶升爬梯横梁处的销轴（3）。

Pin the shafts (3) of the yoke on the telescoping ladders.

通过顶升油缸，取下销轴（8）。

By means of the cylinder relieve and unpin the shafts (8).

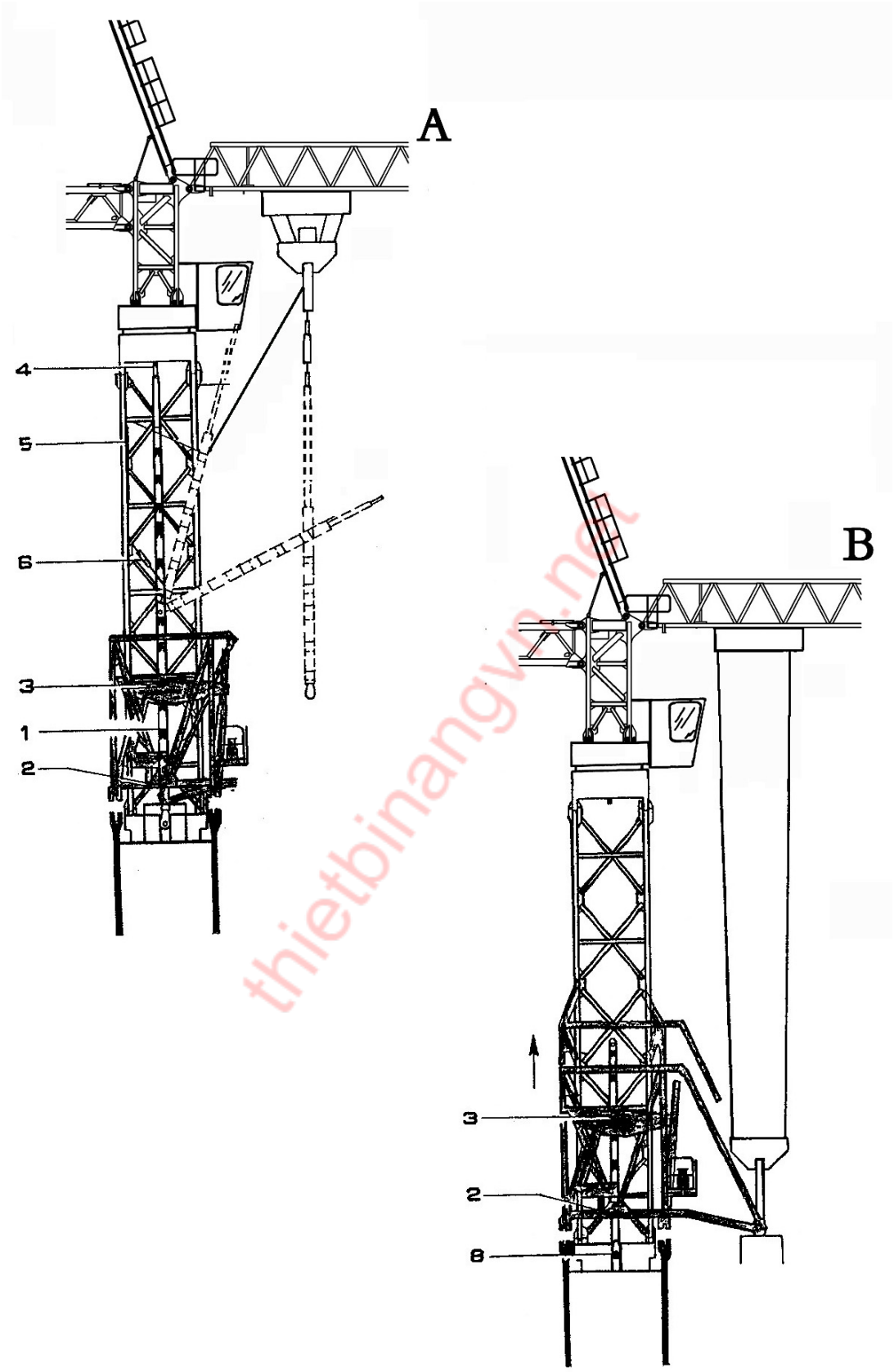


图 4-56 拆卸套架 Fig. 4-56 Dismantling the cage

拆卸套架（续）Dismantling the cage (cont'd)

图 C:

FIGURE C:

伸长油缸，以便升高爬梯，并推出套架连接处销轴（2）。

Extend the cylinder in order to raise the ladders and push out the shafts (2) of the cage fixed point.

退出销轴（3），反复伸长油缸，以便把销轴（3）安放在适当位置上，见详图 a。

Retract the shafts (3), extend the cylinder once more in order to place the shafts (3) in position according to detail A.

把滑轮组架放在地面上，重新装上起升挂钩。

Place the pulley block yoke on the ground and refit the hoist hook.

把油缸横梁系在套架横梁上，并让横梁与油缸垂直。

Attach the yoke of the cylinder to the upper frame of the cage and to the uprights.

取下连接销轴（9）。

Unpin the connection shafts (9).

吊起油缸组件并降至地面上。

Sling and lower the group to the ground.

松开销轴（2）控制拨叉。

Loosen the control forks of the shafts (2).

折叠人字转臂，并用固定杆把人字转臂固定在套架上。

Fold the derricks and fix them to the cage by means of immobilization bars.

装上能承载 1500kg 的调节绳（10、11、12）。

Fit the Tirfors of 1500kg weight (10.11.12).

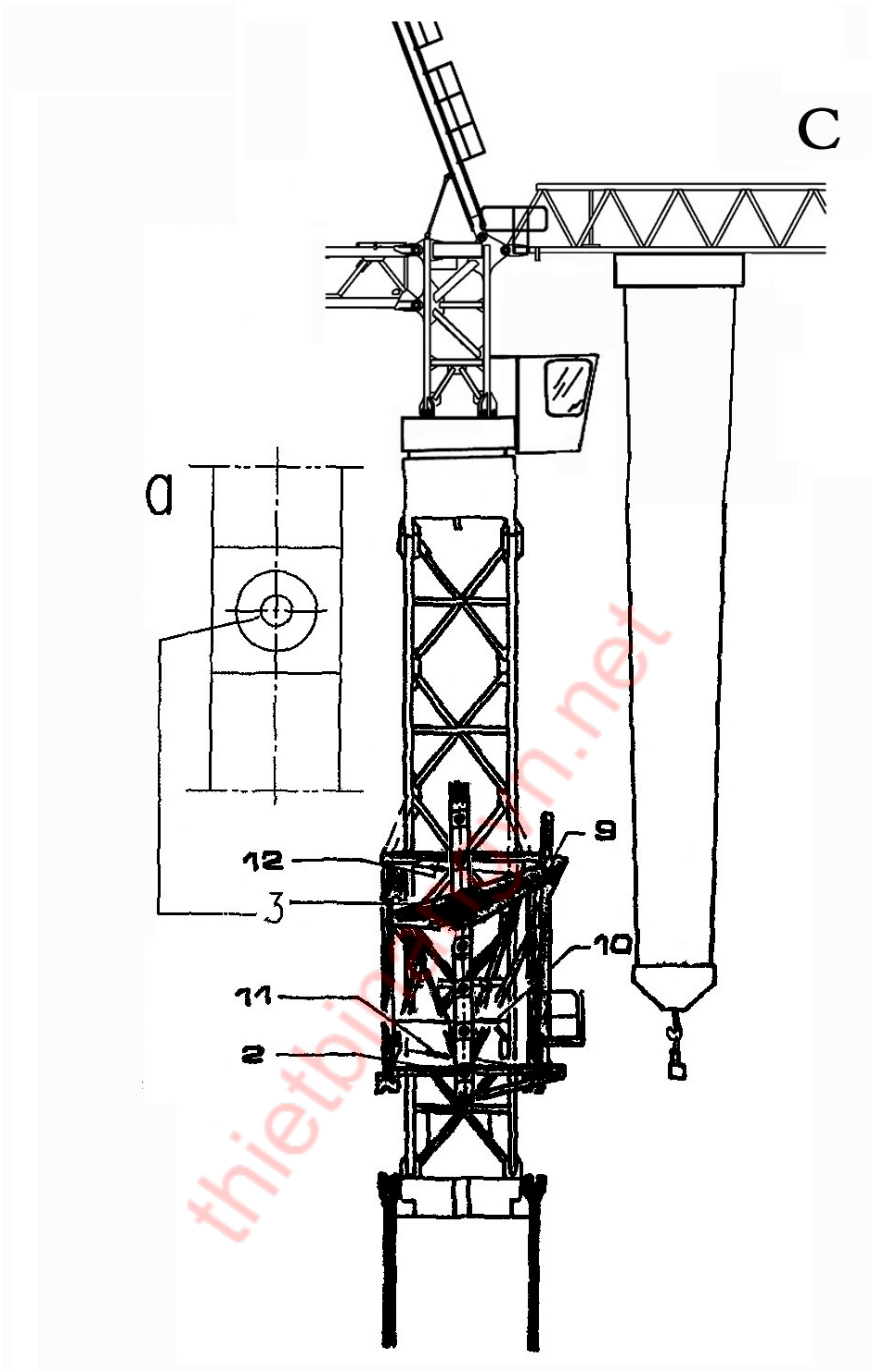


图 4-57 拆卸套架 Fig. 4-57 Dismantling the cage

拆卸套架（续）Dismantling the cage (cont'd)

图 D:

FIGURE D:

把一根吊索放置在套架前片上。

Place a sling around the front section of the cage.

取下连接螺栓。

Take off the connecting bolts

轻轻地拉下吊索，把调节吊索放长，以便滑轮组处于垂直。

Slightly lift in order to remove the slings and pay out the Tirfor ropes so that the pulley block is vertical.

取下调节吊索，把套架前片降至地面上。

Unhook the Tirfor and lower the element to the ground.

旋转塔机，按同样的方式取下套架后片。

Slew the crane and proceed likewise for the rear section of the cage.

重新装配套架

REFITING THE CAGE

在地面上用调节吊索把套架前片和后片连接起来，以相反的顺序进行拆卸操作。

Equip the <front> and <rear> cage sections with Tirfors on the ground and carry out the dismantling operations in the reverse order.

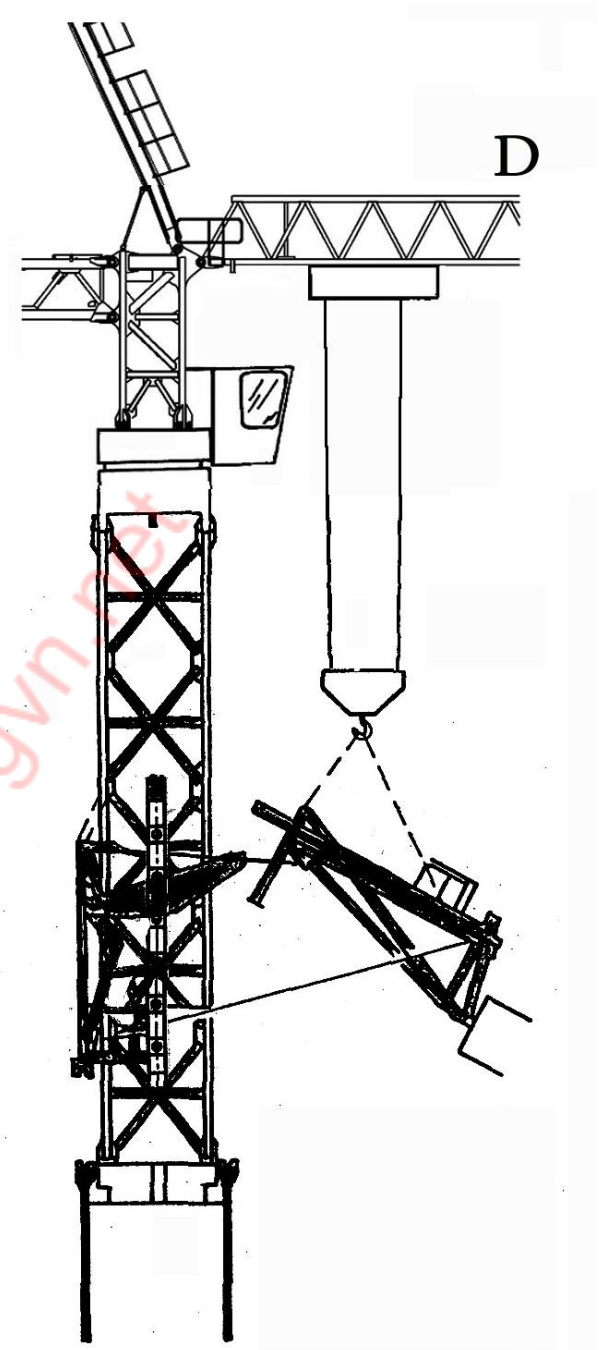


图 4-58 拆卸套架 Fig. 4-58 Dismantling the cage

4.17 投入使用 Putting into service

4.17.1 引言 Introduction

在投入使用前所采取的全部措施都是为了确保塔机能正确驱动并在安全状况下进行工作。

All the operations concerning the putting into service serve to ensure the crane work under correct driving and safety conditions.

在这些措施可分为三类：

On the whole, all these operations can be split up into three groups:

检查并进行适当操作，以避免发生安全事故。

Checking and carrying out the mounting operations in order to avoid any hindrance as regards the proper working order on the safety .

使塔机适应工地要求。

Adaptation of the crane equipment to the site requirements.

调试各安全装置。

Adjusting the various safety devices.

为进行调试，维护保养和操纵控制，按本说明书所示方法，使用塔机的各种装置。

In order to carry out the adjustments and the maintenance and to reach the control unit, use the devices provided on the crane according to the way shown on the service manual.

4.17.2 立塔后的检查 Checks To Be Carried Out After Erection

根据以下叙述进行塔机和安全所必需的某些操作或检查。

The execution of the crane erection and the safety require a certain number of operations or checking to be carried out according to the following description.

表 4-6 Table 4-6

部 位 Component	检 查 项 目 Operations to be carried out
大车运行 Traveling	**行走式 Travelling crane:** 检查轨面，防止障碍物阻止大车运行 Check that there are no obstacles on the track which may hinder the crane travelling. 检查缓存器和限位开关(根据现行标准) Check the fitting of the buffers and the limit switch ramps (according to the standards in force). 拆掉所有楔块和锚固装置 Remove any wedges and anchorages. 松开台车夹轨夹 Release the bogie rail clamps.

	确保行走机构的电气连接 Make sure that the traveling mechanisms are electrically connected. 检查夹轨器及其它必须的锚固装置安装是否正确 Check that the bogie rail clamps and any other anchoring means possibly used are correctly fitted. 切断运行机构电源 Disconnect the travelling mechanisms.
底盘 Chassis	检查电缆卷筒的安装 Check the cable winder fitting. 检查位于轨道中央的电源电缆长度 Check the supply cable length with regard to the centre of track. 如果有一些不工作的锚固件，检查其连接。 Check the attachments of the out of service anchorage, if any. 检查压重是否正确固定。 Check that the ballast is correctly fixed. 检查底盘下的电缆是否顺畅，以防损坏。 Check that the passage of the electric cables under the chassis is properly carried out so as to avoid any damages.
通道 Access	检查扶梯和背圈的安装，换掉已损坏的部分，特别是第一次使用后应锁紧楔块。 Check the fitting of the ladders and back loops, replace damaged parts, especially the locking wedges after a first use.
标准节 Mast	检查标准节间连接销轴应正确地装配。 Check that the mast connecting pins are properly fitted. 检查电缆是否用钢丝绳在电缆挂钩上挂好。 Check that the electric cables are correctly hooked from the cable support rope 检查使滑动底座活动支腿固定的连接螺栓，用所需的力矩拧紧。 Check that the bolts used for immobilizing the connecting shutters of the slider base, have been tightened with the require torque
驾驶室 Cabin	检查驾驶室是否锁紧。 Cheek that the cabin is locked. 检查“驾驶员须知”铭牌是否在驾驶室内钉好。 Make sure that the driving instructions are suck in the cabin.
塔头 Tower head	检查小车检修平台是否安装就位。 Check the fitting of the trolley inspection platform. 检查安全绳是否已在起重臂和塔头撑架上安装好。 Check that the safety ropes are fitted on the jib and the tower head.

	检查起升和变幅钢丝绳穿绕是否正确。 Make sure that the hoist and trolley ropes are reeved. 检查塔头连接情况。 Check the pin-connection of the tower head.
平衡臂 Counter-jib	检查平衡臂上走道与护栏的固定情况。 Cheek the fitting of the counter-jib cat-walks and grab rails. 用作顶升加节的人字转臂锁止(用带柄销轴将塔机突出尖部锁止在适当位置上) Check the locking of the lifting derrick (nose pointing to the crane tower and locked in position by means of a handle shaft). 检查平衡臂配重的固定情况。 Check the counter-jib ballast attachment. 检查平衡臂走道上有无杂物，防止塔机运转时下坠伤人。 Cheek that the cat-walks are cleared of all things which could fall down when operating the crane. 检查起升机构的安装情况。 Check the fitting of hoist winch
起重臂 jib	检查各处连接销轴及开口销的安装是否正确。 Check the assembly of the shafts and split-blots every where whether is correct or not. 检查各处销轴安装固定挡块是否完整、无缺陷。 Check the fixed block with connection pins whether is unbroken. 检查起重小车安装、运行情况。 Check the fitting and traveling of lifting trolley. 检查起重小车防断轴装置和防断绳装置是否有效。 Check the protector with axles breaking and rope breaking and rope breaking of trolley is right or not. 检查起升、变幅钢丝绳的缠绕及固定情况。 Check the winding and fixing condition of hoist rope and trolling rope.
吊具 Hooks	检查吊钩组件有无影响使用的缺陷。 Check hook 检查起升、变幅钢丝绳的规格及型号是否符合要求。 Check hoist-ropy and trolleying-rope 检查钢丝绳的磨损情况。 Check steel rope
润滑 Greasing	根据使用说明书检查润滑油位及润滑点。 Cheek the level and greasing points according to the operating Instructions. 检查回转机构的润滑脂回路 Connect the greasing circuit of the slewing mechanism.

4.17.3 通道及安全装置 Accesses And Safety Devices

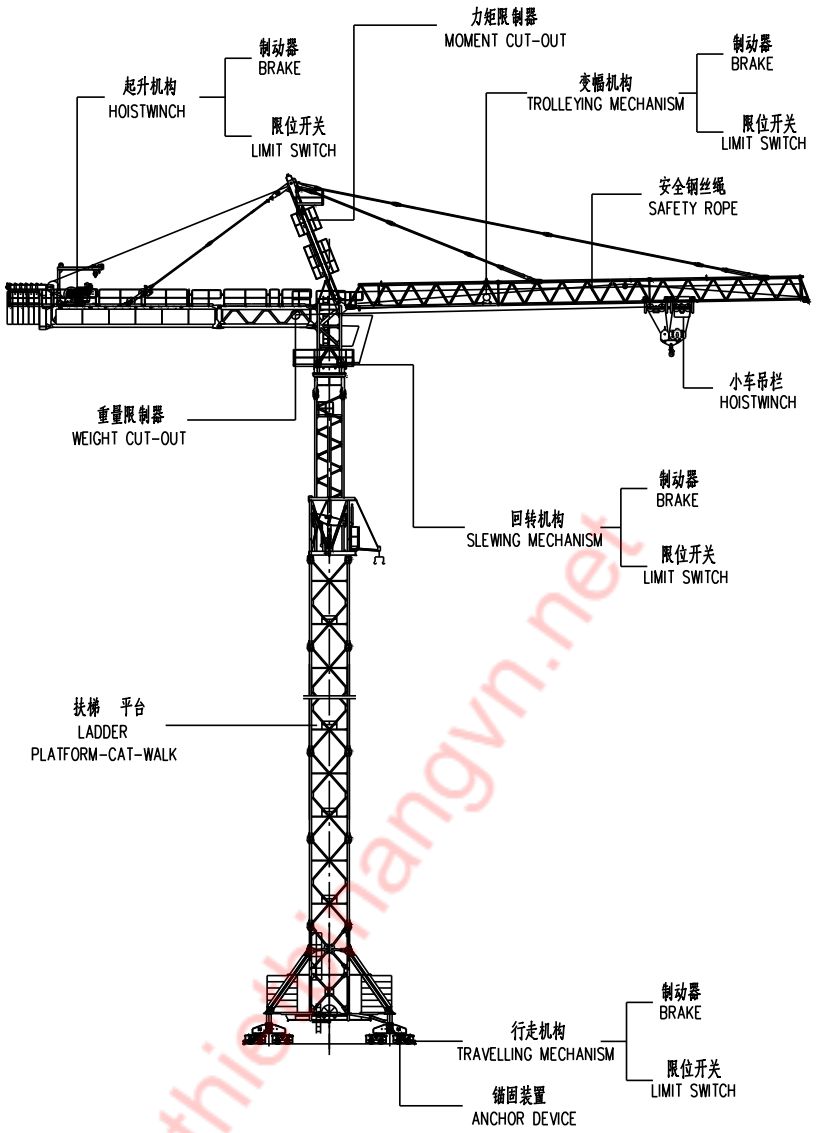


图 4-59 通道及安全装置 Fig. 4-59 Accesses And Safety Devices

注意：塔机安装调试完毕，应完整记录起重量限制器和力矩限制器上的各限位开关与调整螺栓之间的间距。

NOTICE: After the debugging of fix the crane has been finished, it should write down the distance between each limit switch of the weight limiter and the adjusting bolt of the moment limiter.D

塔机投入工作后，应半个月(最长不超过 1 个月)用调试时的相应载荷，对起重量限制器和力矩限制器进行一次检查和校验，使之保持良好的工作状态。

After the crane is put into service, it should adopt the load which is debugged for half month (no more than a month) and check the weight limiter or the moment limiter to keep it in good work situation.

检查和校验时，应检查起重量限制器和力矩限制器上的各限位开关的通电和断电情况，检查起重量限制器和力矩限制器上的各限位开关与调整螺栓之间的间距有无变化，并作好每次检查和校验的记录。

When checking or verifying it, it should check each limit switch of the weight limiter and the moment limiter, wither being fed or being cut-off. It should check whether there are some changes about between each limit switch of the weight limiter or the moment limiter and the distance of the adjusting bolt, and write down the records.

5.拆塔 Dismantling

5.1 引言 Introduction

最后拆塔工作，完全可用汽车吊进行，但依据作业场地情况，部分拆塔工作可由起升机构完成，为此暂不拆除电气装置。

As far as the final stage of dismantling is concerned, this can be carried out entirely by the mobile crane, but site conditions permitting it can be carried out partly by the hoist winch, which requires the electrical installations must not be touched.

本章主要简介平衡臂配重和起重臂这两部分的拆卸。

For this purpose this chapter deals with the two types of dismantling for lowering the counter-jib ballasts and the dismantling of the jib.

特别注意：IMPORTANT ADVICE:

在拆卸某些部件时，如起重臂、平衡臂等，必须遵守安全规程，以防止当移开某一部件时，塔机其余部件失去平衡的危险。

For dismantling certain parts, such as the jib and the counter-jib security regulations must be observed which enable all risk of the load being out of balance with the rest of the crane to be prevented when removing the part.

后页举例说明了起重臂的安全吊卸。

The page opposite shows an example of safety slinging for a jib.

即：在起重臂连接销拆掉以前，先用安全绳（1）和挂环（2）将臂架和塔头连结起来，根据发生不平衡的位置（指向顶部或指向底部），用吊索将臂架根部连在张紧器（3）上，以此保持它的平稳。张紧器张紧后，取掉安全绳（1），操纵张紧器，使起重臂逐渐放下。

This involves linking the jib to the cat-head using a sling (1) and a shackle (2) before unpinning the jib. Depending of where it is out of balance (towards the top or towards the bottom), sling the jib foot to a tensioner (3) form which the stability of the load is maintained. After tightening the tensioner, remove the safety sling (1) and act on the tensioner during lowering the jib.

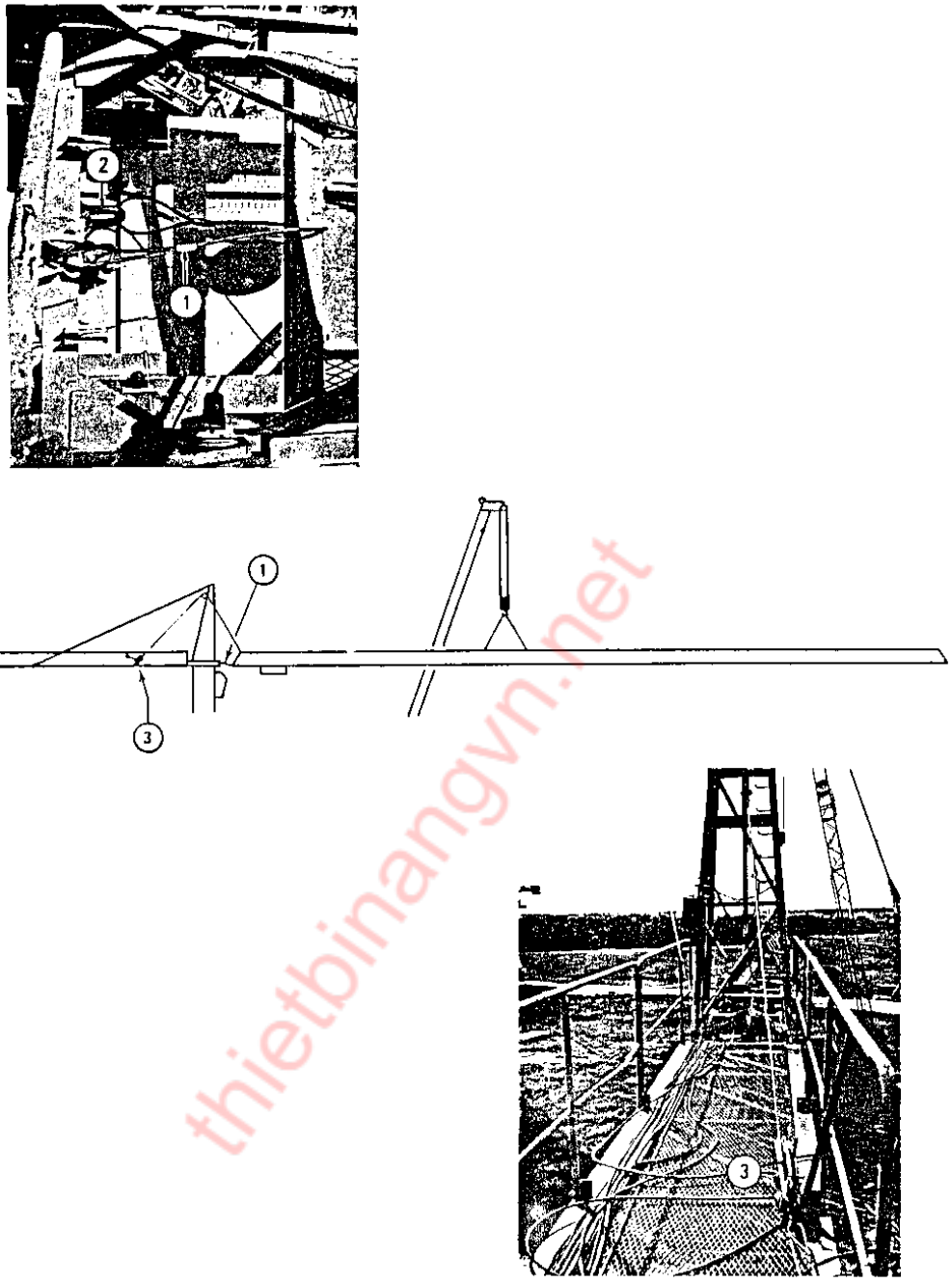


图 5-1 拆塔 Fig. 5-1 Dismantling

5.2 拆塔前的准备工作 Preparing before dismantling

拆卸前的准备工作：Prepaeations before dismantling：

将塔机移至拆卸区域，保证该区域无障碍影响拆卸作业。

Bring the crane to the dismantling area and make sure that there are no obstacles to interfere with the operations.

放下台车夹轨钳，并将其夹紧在轨道上。

Fold down the rail clamps and tighten to the rails.

装套架附件。

Refit the telescoping accessories.

将臂架旋转至套架吊杆一侧。

Slew the jib to the side of the telescoping cage derricks .

塔机顶升配平。

Balance the crane for telescoping.

拆卸：Dismantling

按照立塔相反的顺序进行操作

Carry out the telescoping operations but in the reverse order.

拆卸一个标准节。

To dismantling a mast section.

注意：每次用提升梁降低套架时，将其固定在转臂节杆上，用安全装置锁在吊杆支架上。

CAUTION：Each time the cage is lowered by means to the lifting bar, lock the latter onto the derricks using the safety system located on the derrick arms.

5.3 拆卸塔身标准节 Dismantling of a mast section

把装拆用的吊杆（1）装在标准节上。

Fit the links (1) for handling onto the mast section.

拔掉标准节连接销轴（2）（见图 A）。

Unpin the mast section (2) (figure A).

用油缸顶升起塔身标准节（见图 B）。

Raise the mast-cage assembly by means of the cylinder (figure B).

把锁销（3）插入鱼尾板后，下降标准节，用锁销（3）把标准节放在较低层标准节的鱼尾板上。（图 C 中详图 E）转动加节吊杆（4）（图 B、C）。Having inserted the pins (3) into the mast fishplates, lower the mast-cage assembly and rest the assembly on the fishplates of the lower mast section by means of pins (3) (figure C detail E). Fold down the derricks (4) (figure B-C).

拔出标准节中的插销。

Unpin the cape from the mast section.

用油缸顶升套架，把套架从标准节的鱼尾板上脱开（图 C）。

Raise the cage by means of the cylinder to disengage it from the mast fish-plates (figure C).

继续这个操作过程，使得吊杆钩钩住吊杆（1）并升起标准节（图 D）。

Continue the operation to allow the derrick yokes (5) to hook the links (1) and to lift the mast section (figure D).

分离二分之一标准节，从较低层的鱼尾板上拔出锁销（3）（详图 E）。

Disconnect the semi-mast section and remove the pins (3) from the lower fishplates (Detail E).

把加节吊杆（4）移到它所在的位置以便用吊钩能钩住二分之一标准节，并下放到地面上（图 D）。

Put the derrick (4) into position so that the semi-mast sections can be seized by means of the lifting bar and lower them to the ground (figure D).

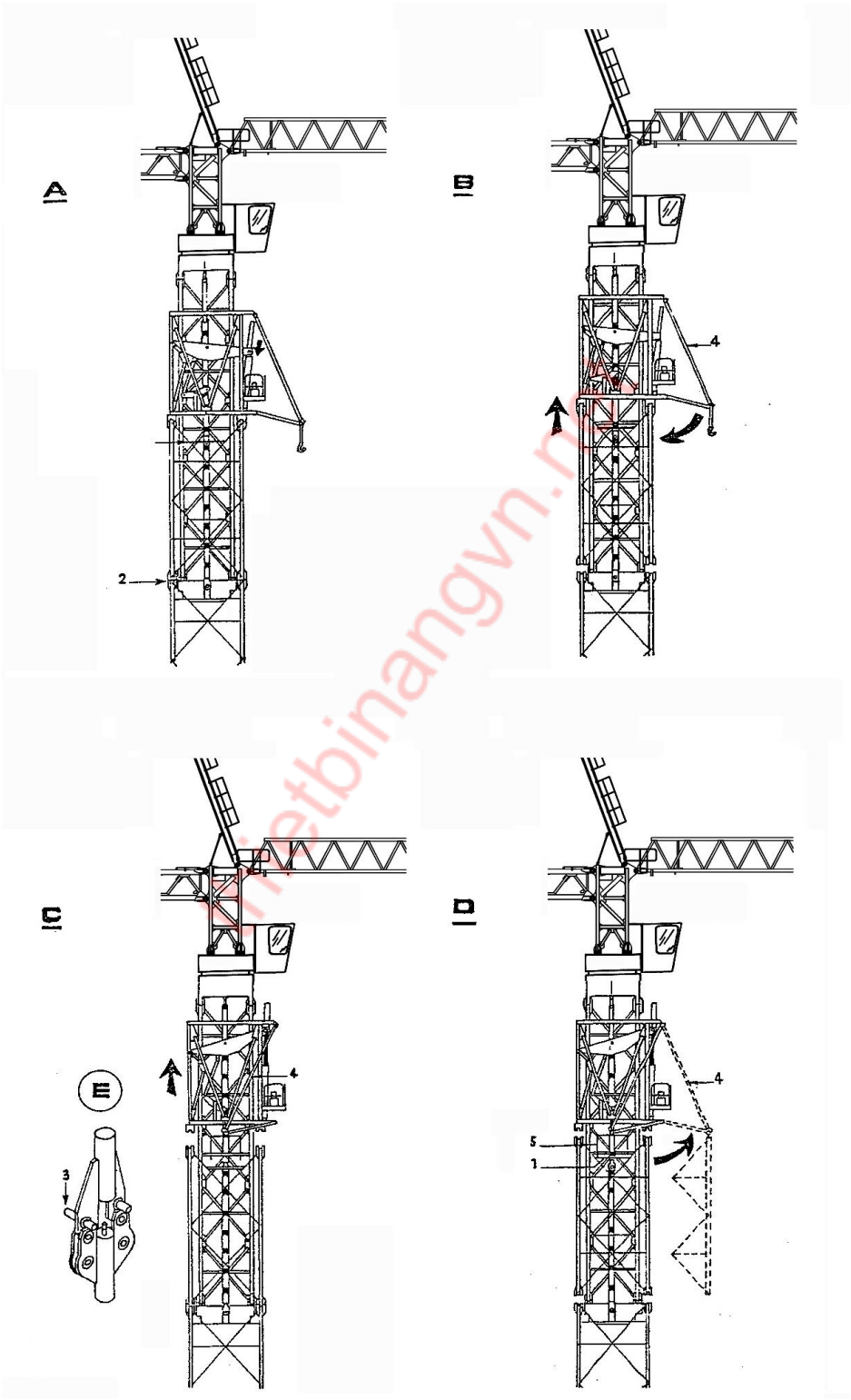


图 5-2 拆卸标准节 Fig. 5-2 Dismantling of a mast section

5.4 拆除钢丝绳和配重 Removing the ropes and the counter jib ballast

将吊钩滑轮组降至地面。

Place the pulley block on the ground.

从起重臂端的旋座（2）上将钢丝绳固定楔套（1）取下。

Unpin rope anchor box (1) from the swivel at the jib nose (2).

在配重和起重臂端不能用辅助吊车拆卸时，应将起升绳缠绕在起升机构卷筒上。如用辅助吊车拆卸，则可将起升绳全部绕在其他绳筒上保存起来。

When the counter-jib ballast and the jib cannot be dismantled by means of the mobile crane, wind the hoist rope onto the hoist rope drum. Otherwise, it can be stored away on a reel.

利用拆绳，对钢丝绳全长进行认真检查。

SEIZE THE OPPORTUNITY OF THIS DISMANTLING TO CHECK THE ROPE OVER ITS WHOLE LENGTH.

按照有关说明的相反程序，用辅助吊车或起升卷扬机拆下配重。

Lower the counter-jib ballast either using the mobile crane or the hoist winch according to the instruction on the reverse order.

将小车移至臂根，从小车上将钢丝绳卸下。将小车后绳缠绕在小车卷筒上。拆除小车前绳，将起重小车固定在起重臂上。

Move the trolley to the jib foot, unpin the ropes from the trolley.Wind the rear rope(s) onto the trolley rope drum. Remove the front ropes. Immobilize the trolley on the jib.

拆除全部附件。拆开连接的电缆、安全绳等。

Remove all accessories. Release the electric cables connecting structure elements as well as the safety rope or others.

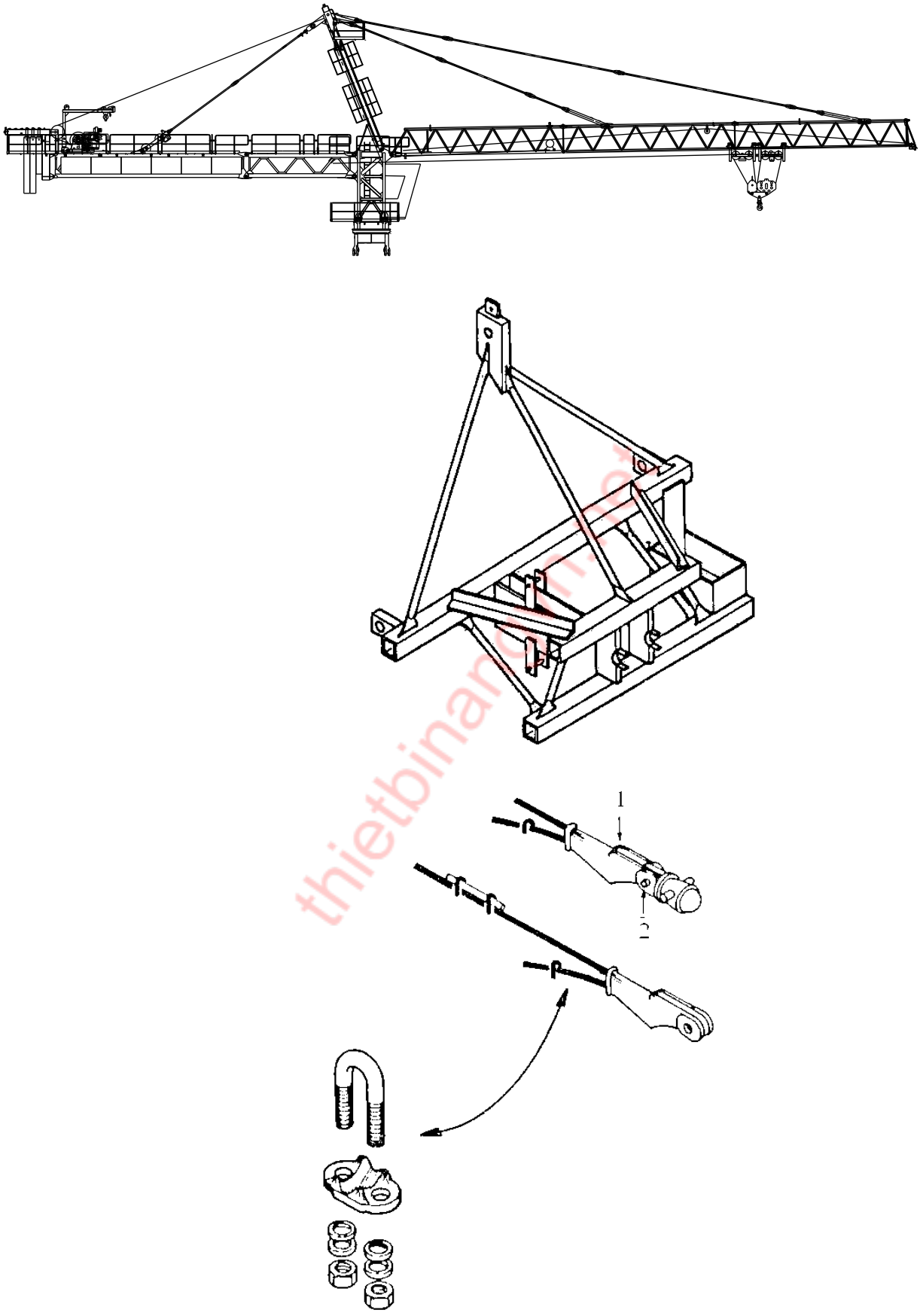


图 5-3 拆卸钢丝绳 Fig. 5-3 Dismantling of rope

5.5 拆卸起重臂 Dismantling the jib

拆卸起重臂时，需用一台与立塔时使用特性相同的辅助吊车。该吊车不仅用于拆卸起重臂，还能用于拆除塔机其它所有部件。

This dismantling requires a mobile crane with at least the same characteristics as that used when erecting. Apart from the jib, this mobile crane will allow to totally dismantle the crane.

如果辅助吊车具有足够的起重能力，可根据有关章节所示的起重臂吊装点吊装。

If the mobile crane's capacity is adequate, sling the jib at the points indicated in the instruction.

拆除起重臂有三道程序：

There are 3 operations to the dismantling.

A—拆除平衡臂连接横梁。

A—Unpinning the yoke of the counter-jib.

B—拆除拉杆。

B—Unpinning the jib ties.

C—将起重臂降至地面。

C—Lowering the jib to the ground.

拆卸起重臂时应有一根安全索将臂根和驾驶室节连接起来。如果工地条件允许的话，可将起重臂回转至最有利位置。

Before jib dismantling, place a safety sling connecting the jib foot and the cab mast if site conditions allow, the jib must be slewed to the most favorable position.

第一步 A：用 12 米Φ21.3 吊索（1），按有关章节所示的吊装点将起重臂吊起，在平衡臂上安装 5000kg，绳长 40m 的张紧器（2）。放松张紧器使拉杆松驰，卸掉平衡臂连杆撑架（3）。

First phase A: Sling the jib using two 12m slings Φ21.3 (1) at the points indicated in the instruction. Fit on the counter-jib a 5000kg tirfor (2) with a 40m rope as indicated in the instruction. Operate the tirfor to slacken the ties, unpin the counter-jib yoke (3).

第二步 B：放松张紧器，并将起重臂稍下降，塔头撑架向前倾斜，到位后，销上连杆（4）。抬起起重臂，卸掉拉杆（5）和（6）。检查起重臂拉杆是否放入托夹中，为安全起见，最好将拉杆（5）和（6）缚于臂根（7）处。

Second phase B: While using the tirfor, lower the nose, the struct swings forwards and arrives in position, pin the connecting links (4). Raise the jib by means of the mobile crane, unpin ties (5) and (6). Check that the jib ties are well inserted in the brackets and to increase the safety, bind ties

(5) and (6) in the jib foot at (7).

第三步 C：将起重臂举成水平，卸掉销轴（8），将起重臂与回转塔身分离，用系在臂端的绳索导向，逐渐将臂放下。

Third phase C: Bring the jib to horizontal position, unpin the shafts of the jib foot (8). Move out the jib foot and lower the jib guiding it with cords attached to the nose.

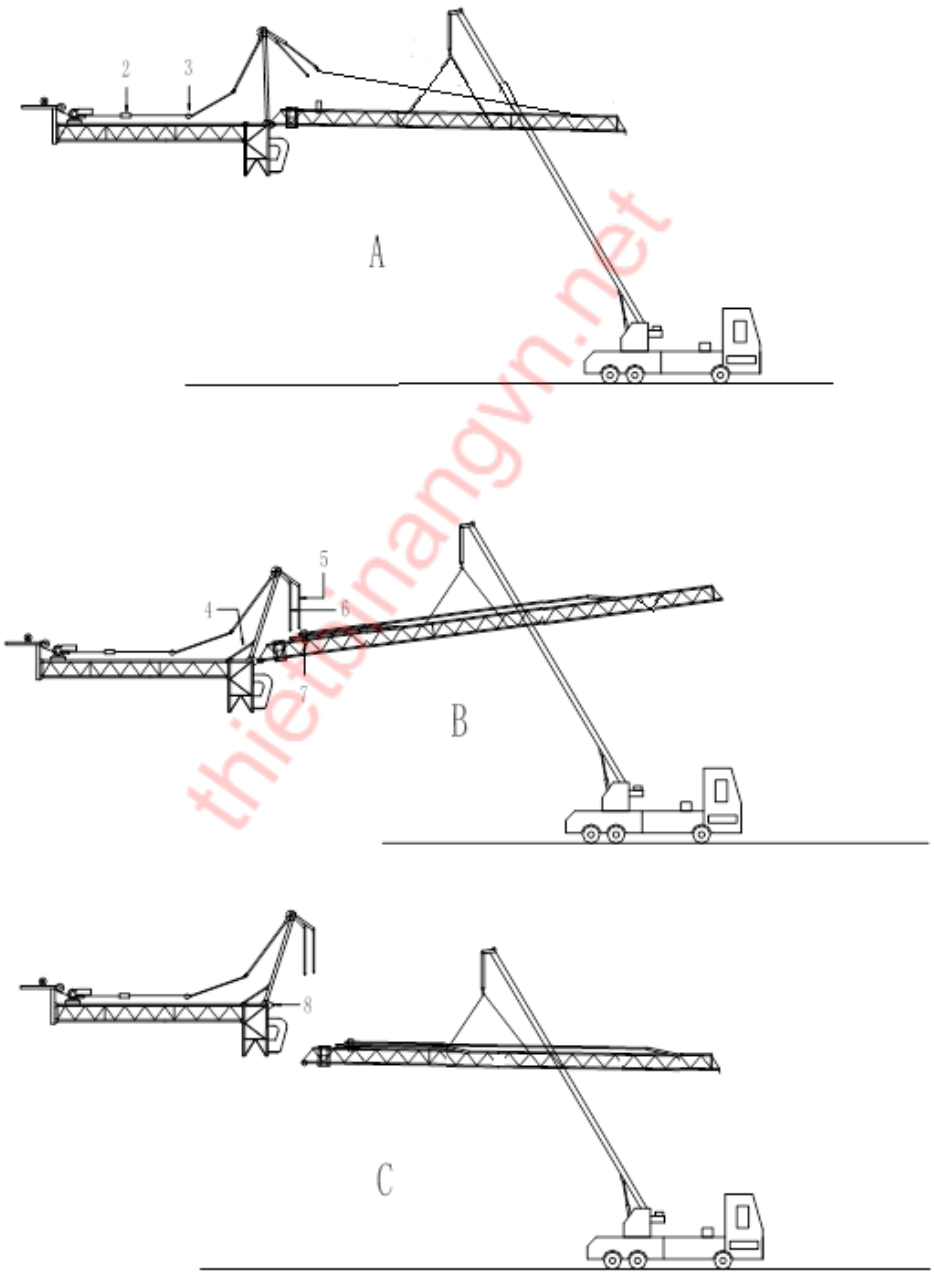


图 5-4 拆卸起重臂 Fig. 5-4 Dismantling of jib

5.6 拆卸拉杆和起升机构 Dismantling the ties and the winch

平衡臂拉杆松弛，拉杆(1)仍留在塔头撑架上。卸掉拉杆(2)，但让其仍与连接横梁(3)连在一起。用铁丝将拉杆(2)和连接横梁(3)缚于平衡臂根部。拆掉张紧器。拆掉起升机构座的轴销。用三根 4 米吊索(6)将起升机构吊起，该吊索由三个挂钩固定在起升机构机座的吊环上。

With the counter-jib tie line slackened, ties (1) are resting on the strut. Unpin ties (2) but leave them pinned to the yoke (3). Attach ties (2) and yoke (3) with wire on the counter-jib foot. Dismantle the Tirfor. Unpin shaft. Sling the winch using three 4m slings (6) fixed to the loops provided on the winch support using 3 shackles.

将起升机构放到地面。

Lower the winch to the ground.

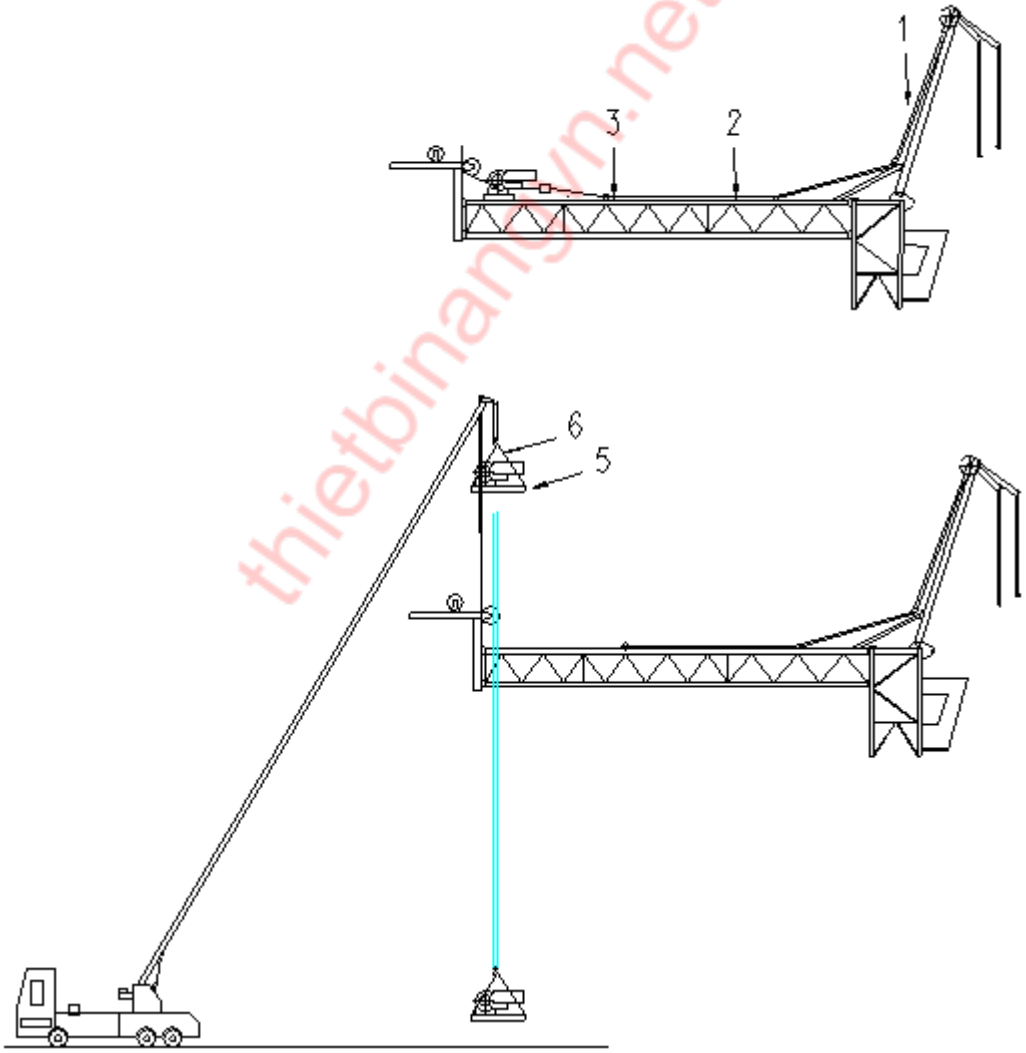


图 5-5 拆卸拉杆和起升机构 Fig. 5-5 Dismantling the bar and winch

5.7 拆卸平衡臂 Dismantling the counter jib

根据辅助吊车的起重能力可采取两种形式拆卸平衡臂。

There are 2 versions for dismantling the counter-jib depending on the capacities of the mobile crane.

1)拆卸全臂。

Dismantling the complete counter-jib.

2)分别拆卸平衡臂端和平衡臂根。

Dismantling the counter-jib nose. Dismantling the counter-jib foot.

这两种卸臂形式需采用专用斜向楔置于平衡臂根部。

These 2 versions of dismantling require the use of oblique wedges placed on the counter-jib foot provided for this purpose.

采用这两种方法卸臂时，应在平衡臂和驾驶室节之间系上安全索。

In these two versions of dismantling, fit a safety sling between the counter-jib and the cab mast.

5.7.1 拆卸平衡臂全臂 Dismantling the counter-jib

采用这种拆卸方法，平衡臂(1)仅用一道工序即可拆下。用 4 根 8 米长 ϕ21.3 吊索(2)在规定吊点将平衡臂吊起。为便于取出下轴销(3)最好如详图 a 采用斜向楔块(4)和模块(5)。由于平衡臂尚处于牢固结合状态，仅用辅助吊车尚难将下连接轴销抽出。下轴销(3)取出后，将其留在存销卡箍内。辅助吊车将平衡臂稍抬起，上轴销(6)即能取出，并插入存销卡箍内。辅助吊车继续工作将平衡臂从驾驶室节中抽出，取掉安全索，将平衡臂放至地面。

For this dismantling, the counter-jib (1) will be dismantled in a single operation. Sling the counter-jib using 4 slings ~21. 3 length 8 m (2)at the slinging points provided. To facilitate removal of the lower shafts (3),it is advisable to use oblique wedges (4) and wedges (5) as detail a. As the counter-jib is engaged, It is difficult to unpin the lower shafts maneuvering the mobile crane; Take out the lower shafts (3) and leave them in the shaft-inserting devices. Unpin upper shafts (6) maneuvering the mobile crane, leave them in the shaft-inserting devices. Maneuver with the mobile crane to move the counter-jib out from the cab mast, free the safety sling, place the counter-jib on the ground.

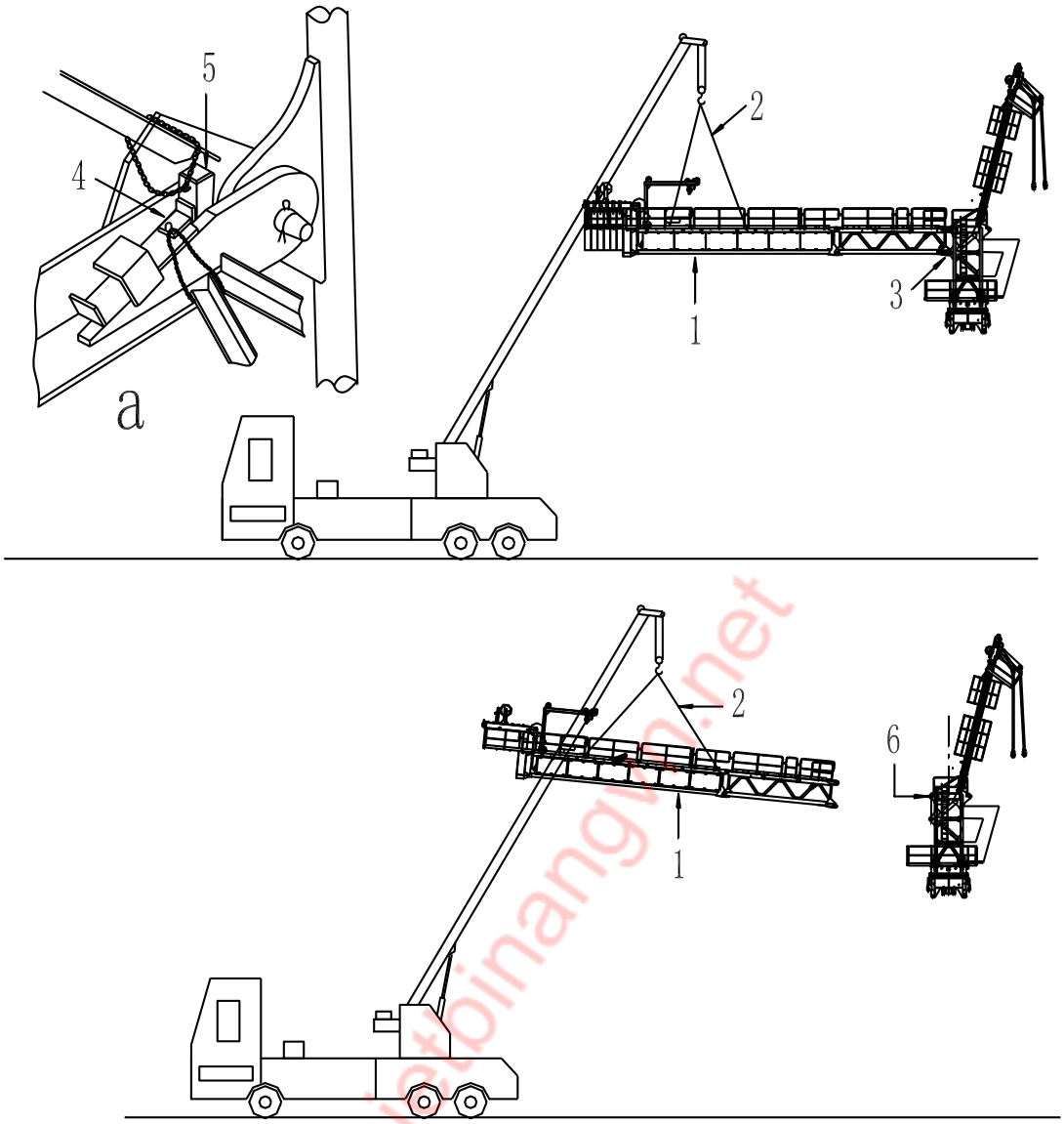


图 5-6 拆卸平衡臂 Fig. 5-6 Dismantling the counter-jib

5.7.2 分别拆卸平衡臂端和平衡臂根 Dismantling the counter-jib

采用这种拆卸需分两步进行：

There are 2 phases to the dismantling:

a 一拆卸平衡臂端；

a. Dismantling the counter-jib nose.

b 一拆卸平衡臂根。

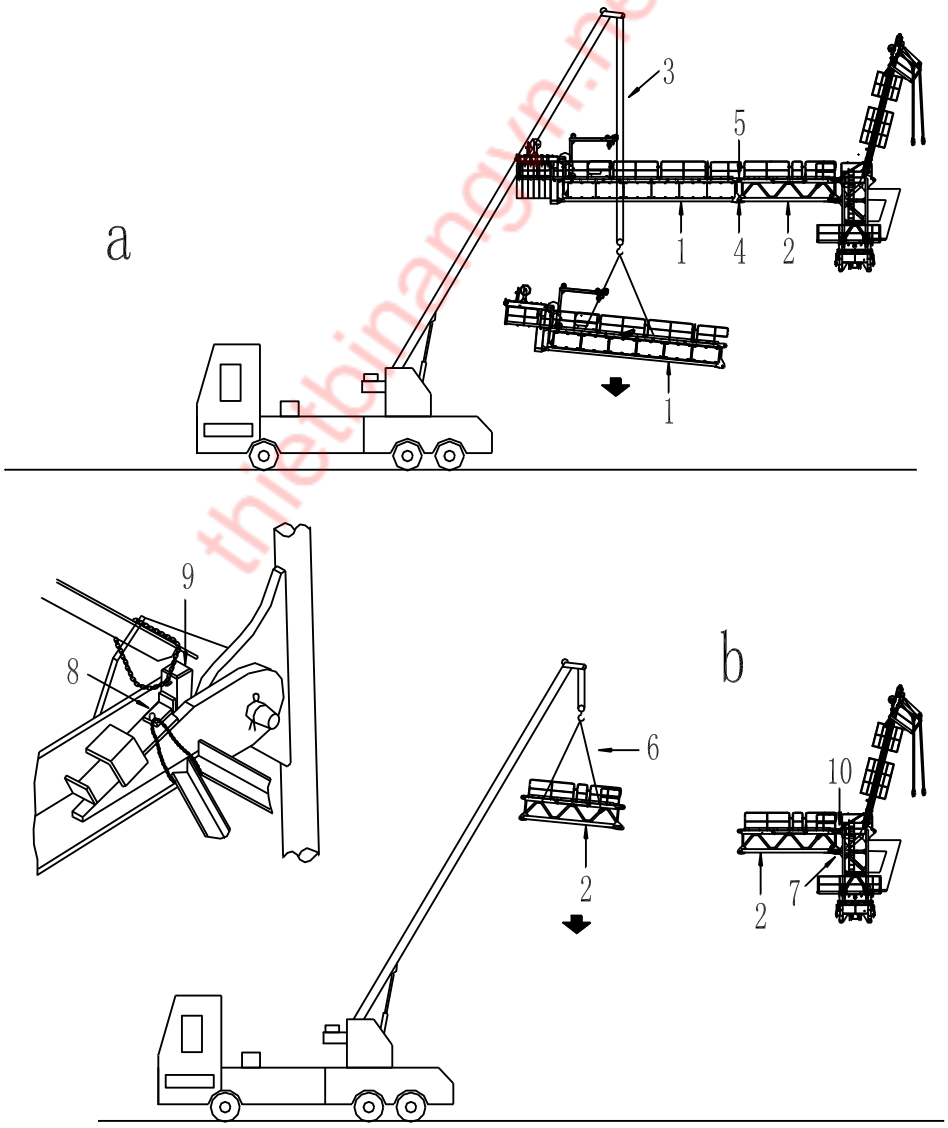
b. Dismantling the counter-jib foot.

第一步：拆掉平衡臂端部(1)和根部(2)之间的连接走道。用四根长 8m、Φ21.3 的吊索(3)挂在臂端前部的吊点和起升机构座连接板后面的吊点上，将平衡臂端吊住。用辅助吊车活动臂端，使下轴销(4)容易抽出。再将臂端稍提起卸掉上轴销(5)，将平衡臂端从结合处抽出，并降至地面上。取掉吊索。

First phase: Fold back the connecting cat walk between the nose (1) and the foot (2). Sling the nose using four 8m. Slings Φ21.3 (3),on the slinging points provided at the front of the nose and at the rear on the gusset of the winch support. Unpin the lower shafts (4) maneuvering the mobile crane to facilitate their removal. Unpin the upper shafts (5),move the counter-jib out and place it on the ground. Free the sling.

第二步；用Φ21.3，8 米长吊索(6)两根，绕过臂根斜撑将臂根(2)吊起。由于平衡臂处于牢固的结合状态，为便于取掉下轴销(7)，最好使用斜向楔(8)和楔块(9)。见详图。卸掉上轴销(10)，将平衡臂根从驾驶室节中移出，解掉安全绳，将平衡臂根降至地面上。

Second phase :Sling the counter-jib foot (2) using two 8m slings Φ21.6 (6),pass them between the diagonal braces of the foot. To facilitate removal of the lower shafts (7), it is advisable to use oblique wedges (8) and wedges (9). As the counter-jib is engaged, it is difficult to unpin the lower shaft maneuvering with the mobile crane. See detail. Unpin the upper shafts (10),move the counter-jib foot out from the cab mast, free the safety sling and place the counter-jib foot on the ground.



图**图 5-7 拆卸平衡臂 Fig. 5-7 Dismantling the counter-jib**

5.8 拆卸塔头撑架、驾驶室节、回转支承 Dismantling The Strut,The Cab Mast, Pivot

检查相邻的两个组件间是否有电缆连接。

Check that no electric cable remains fitted between two successive assemblies.

拆卸塔头撑架：Lowering the strut:

用一根 4 米长的吊索将撑架吊住，卸掉连杆，抽出撑架轴销，将撑架拆下放至地面上。

Fit a 4m sling on the strut, unpin the retaining links . Unpin the shafts of the strut, disconnect it and lower it down to the ground.

拆卸驾驶室节：Lowering the cab mast:

用两根 8 米长的吊索(Φ21.3)将驾驶室节吊住。拆开驾驶室节，并将其下放至地面。

Fit two 8m sling (Φ21.3) oh the cab mast. Use the quoins and wedges provided to unpin the shafts connecting it with the tower head. Disconnect and lower the cab mast to the ground.

拆卸回转支承；Lowering the pivot:

先用辅助吊车吊住顶升套架，拨去套架与回转支承间的连接销，并将套架落在耳座上。再用Φ21.3，8 米长吊索两根挂住回转支承，抽出回转支承与塔身第一节连接的轴销，将回转支承放至地面。

Fit slings on the telescopic cage, unpin it from the tower-head and rest it on the lugs. Fit two 8m slings (Φ21.3) on the tower-head; unpin the shafts connecting it to the basic mast; disconnect and lower it to the ground.

如现场条件允许，也可采用一道工序将驾驶室节——回转支承整体拆卸下来。

If the site conditions allow, dismantling the cab mast tower-head assembly in one single operation is possible.

5.9 拆卸内塔身、滑动底座和底盘 Dismantling the inner mast, slider and chassis

拆卸内塔身和滑动底座。Dismantling the inner mast and slider.

拆卸底盘：Dismantling the chassis:

将夹轨器在轨道上夹紧。

The bogie rail clamps are clamped to the rails.

拆卸压重。

Dismantling the crane.

拆卸通道，如有电缆卷筒也一起拆除。

Remove the accesses and the cable winder, if any.

拆下斜撑和推力杆。

Dismantle the oblique legs and the struts.

用两根 4m 长的钢丝绳吊起基础节，吊环挂在鱼尾板轴销上。

Sling the basic mast unit using two 4m slings fitted around the fishplate bolts.

从纵梁上卸下基础节并将其放置地面。

Unpin the basic mast unit from the side members and lower it to the ground.

将纵梁从横梁上卸下，并放到地面。

Unpin the side members from the cross beams and place them on the ground.

吊卸横梁，拆掉连接台车的连接支座。

Sling the cross-beams, Remove the connection support of the motor bogies.

松开夹轨器，把台车从轨道上卸下。

Release the bogie rail clamps and remove the motor bogies from the rail.