HAIAN ENTERPRISE
海安企业

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HAIAN ENTERPRISE
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ALL STEEL RADIAL
OFF-THE-ROAD TYRE MAINTENANCE MANUAL
全钢巨型子午线工程机械轮胎维护手册

创新
INNOVATION

着实
PRAGMATIC

诚信
INTEGRITY

宏伟
GREATNESS

前言Preface

福建省海安橡胶有限公司制作本手册的目的是希望提供给客户关于全钢工程机械轮胎详细的、有操作意义的信息。本书主要涉及陆安牌子午线工程轮胎的基本构造、选配、使用、日常维护注意事项及其他重要操作指南。海安公司希望您能通过本手册达到提高工作效率、控制成本的作用。

福建省海安橡胶有限公司是中国境内最为专业的巨型全钢子午线工程机械轮胎制造商和轮胎服务专家，海安巨型子午线工程机械轮胎规格齐全，且质量已达到国际一流水平。当然，如何使轮胎使用效率达到最大值，从而减少成本，离不开客户对轮胎的悉心照料和使用。因此，海安公司根据以往客户的一些使用案例、并严格按照国际轮胎使用标准，特意编制本书，以便客户查阅。

本书虽历经数次认真编辑、修订，但难免遗漏或不全之处，望予以指出。

Fujian Haian Rubber Co., Ltd makes this manual with the purpose of providing some detailed and feasible information on Luan tyre to customer. This manual includes Luan tyre structure, selection, usage, daily maintenance guide and some other operation guide, we hope this manual can help you to improve efficiency and save cost.

Fujian Haian Rubber Co., Ltd is the most professional OTR tyre manufacturer and service specialist in China, we have complete tyre size and first-class tyre quality. Of course, proper usage and careful maintenance will decide whether can maximize tyres' performance and save cost. Therefore, we make this manual based on previous successful experience and international tyre usage standard for customer checking.

Although this manual has been modified several times, maybe there's still something missing, please keep us informed if necessary.

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第一部分
海安轮胎简介

Part I
HAIAN Tyre Introduction

1 子午线工程机械轮胎的定义及胎侧标识
Definition & Markings of the Off-the-road Radial Tyre

定义：

轮胎两胎圈间的钢丝帘线与胎面中心线成 90° 排列，胎体上由一条相邻的小角度高强力的钢丝帘布相互交叉，基本上不能伸张的环状带束层箍紧的空气轮胎，并且装配在载重车使用的轮胎。全钢载重子午线轮胎分为有内胎和无内胎两种。海安公司生产的子午线工程轮胎都属于无内胎轮胎。

Definition：

The cord plies between two beads are arranged at 90 degrees to the direction of radially. All steel cords have an angle and cross over with each other. The OTR radial tyre is divided into tube tyre and tubeless tyre. All earth mover tyre manufactured by Haian company is tubeless tyre.

各部件的作用：

束层 ：
是胎面与胎体的过渡区。
(2) 缓和冲击力。
Belt Ply：
(1) transition area between tread and carcass.
(2) Ease the impact from ground.

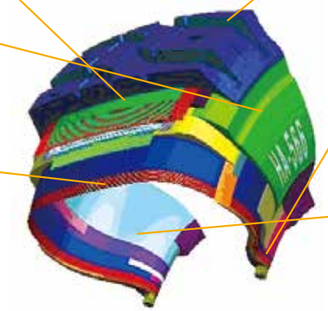
：保护带束层和胎体。具有耐磨，缓
抗冲击、防滑、驱动和制动等作用。
Tread：Protect the belt ply and carcass, wear resistance, shock resistance, skid resistance, traction and brake.

侧作用：保护胎体。
Sidewall：Protect carcass

：把轮胎箍紧在轮辋上。
Bead：Fasten the tyre on the rim.

体：
承受轮胎的气压
支撑轮胎的负荷。
承受和缓冲外来的冲击
Carcass：
1. Bear the tyre pressure.
2. Support the tyre load.
3. Carry the impact from outside

层：轮胎气压密封作用
Inner Linner：
seal the air inside the tyre.

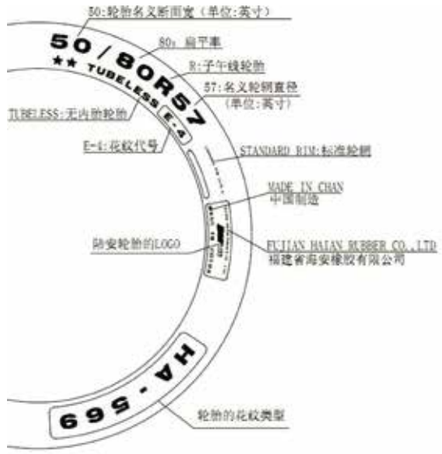


胎侧标识介绍：

1. 商标和 (或) 生产厂家的名称；
2. 品牌、规格；
3. 花纹类型；
4. 使用轮辋规格；
5.“ TUBELESS ”无内胎轮胎标志
6. 标明星级标准或★★；
7. 原产地“ MADE IN CHINA ”；
8. 安全警告标识；
9. 胎号

Sidewall Markings：

1. Trademark and (or) the manufacturer’s name；
2. Brand name and size
3. Tread Pattern code
4. Standard Rim size
5. “ TUBELESS ”means that the tyre is tubeless
6. Star Rating or ★★
7. Place of Origin“ MADE IN CHINA ”
8. Safety Label
9. Tyre Serial number



2 子午线轮胎的优越性
Advantages of the Off-the-road Radial Tyre

子午线轮胎的优越性：

子午线轮胎的耐磨性好，滚动阻力小、省油，牵引力和刹车性能好，转弯能力大，噪音小，乘坐舒适性能好，使用寿命长，驱动力大，直线行驶稳定性好。

Advantages of the OTR radial tyre：

Radial tyre has advantages of better wear resistance, lower rolling resistance which contribute to fuel saving, better traction & brake, lower noise, longer lifetime and better directional stability.

子午胎

子午胎：

胎侧与胎面功能互不影响，胎侧曲挠不会影响到胎面的作用，因此：
1. 胎面与路面的接触面变形小；
2. 与路面的接触面运动少；
3. 带束层之间不会有摩擦

优点：

- ●轮胎寿命更长
- ●在任何路面上摩擦更少
- ●因滚动阻力小，所以耗油更少
- ●驾驶更稳，更舒适
- ●更抗扎刺
- ●更具耐热性

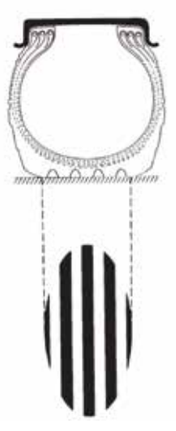
Radial Tyre：

The sidewall function separates from tread, and the tread is unaffected by sidewall flexing, therefore:
1. Less deformation of the contact patch.
2. Less movement on the contact patch.
3. No friction among belt plies.

dvantages：

- ●Longer tyre life.
- ●Less friction on any kinds of ground.
- ●Fuel saving due to lower rolling resistance.
- ●Improved driving performance.
- ●Increased resistance to punctures.
- ●Increased resistance to heating.

斜交胎



斜交胎的特点：

胎冠与胎侧同一层的构造。胎面层会因胎侧曲挠而引起：
1. 胎面与路面接触面变形大；
2. 与路面的接触面运动大；

缺点：

- ●加速胎面磨耗；
- ●抓地力不强；
- ●耗油量大

s Tyre：

The crown and sidewalls are formed at the same ply, the tread is affected by sidewall flexing.
1. More deformation of the contact patch.
2. More movement on the contact patch.

Disadvantages：

- ●Accelerated wear.
- ●Less road holding.
- ●Increased fuel consumption.

3 海安牌子午线工程机械轮胎系列
HAIAN Tyre Serial

海安橡胶轮胎技术参数 HAIAN OTR SPECIFICATION

HAIAN OTR SPECIFICATION 海安橡胶轮胎技术参数

Tire 轮胎规格	Star 星	Standard 钢丝	Optional 越野	TRA Code 气压	SW 断面宽度 (mm)	OD 外直径 (mm)	Tread Depth 花纹深度 (mm)	minimum dual spacing 双胎最小间距 (mm)	Static Loaded Radius 静负荷半径 (mm)	Static Loaded Section Width 静负荷断面宽度 (mm)	Standard Rim (10km/h) 标准轮辋 (kg)	Standard Rim (10km/h) 标准轮辋 (Kpa)	Standard Rim (50km/h) 标准轮辋 (kg)	Standard Rim (50km/h) 标准轮辋 (Kpa)	TL		
27.00R49	★★	19.50/4.0		E-4	740	2690	82	895	1228	868	45000	800	27250	650	514	555	473
	★★	19.50/4.0		E-4											500	535	465
	★★	19.50/4.0		E-4											450	480	420
	★★	19.50/4.0		E-4			69								525	567	480
30.00R51	★★	22.00/4.5		E-4	845	2878	75	1005	1290	990	56000	800	33500	650	588	643	536
33.00R51	★★	24.00/5.0		E-4	920	3030	95	1080	1357	1065	65000	800	38750	650	565	634	496
	★★	24.00/5.0		E-4											625	705	545
36.00R51	★★	26.00/5.0		E-4	990	3194	92	1183	1428	1159	80000	800	46250	650	632	730	535
	★★	26.00/5.0		E-4			83								814	888	740
37.00R57	★★	27.00/6.0	29.00/6.0	E-4	1050	3440	93	1242	1550	1225	82500	800	53000	725	910	994	826
	★★	27.00/6.0	29.00/6.0	E-4			99								825	900	750
	★★	27.00/6.0	29.00/6.0	E-4											880	960	800
40.00R57	★★	29.00/6.0	32.00/6.0	E-4	1130	3560	78	1380	1605	1345	100000	800	60000	725	1020	1080	960
	★★	29.00/6.0	32.00/6.0	E-4			85								980	1050	910
	★★	29.00/6.0	32.00/6.0	E-4			99								805	860	750
	★★	29.00/6.0	32.00/6.0	E-4			93								915	975	855
	★★	29.00/6.0	32.00/6.0	E-4											930	993	875
46/90R57	★★	29.00/6.0	32.00/6.0	E-4	1180	3560	85	1467	1598	1440			63000	700	1035	1120	950
	★★	29.00/6.0	32.00/6.0	E-4			99								990	1050	930
	★★	29.00/6.0	32.00/6.0	E-4											898	980	816
50/80R57	★★	34.00/5.0		E-4	1266	3620	85	1583	1572	1554			73000	600	1207	1420	994
	★★	34.00/5.0		E-4			95								1170	1366	974
	★★	34.00/5.0		E-4											980	1180	780
53/80R63	★★	36.00/5.0	38.00/5.0	E-4	1330	3780	85	1678	1639	1625			82500	600	1277	1516	1028
55/80R57	★★	44.00/5.0	42.00/5.0	L-5	1428	3738	118		1623.4	1743	100000	650		600			
59/80R63	★★	44.00/5.0		E-4	1480	4026	88	1870	1730	1803			100000	600	1476	1736	1216

Tire 轮胎规格	Star 星	Standard 钢丝	Optional 越野	TRA Code 气压	号	SW 断面宽度 (mm)	OD 外直径 (mm)	Tread Depth 花纹深度 (mm)	minimum dual spacing 双胎最小间距 (mm)	Static Loaded Radius 静负荷半径 (mm)	Static Loaded Section Width 静负荷断面宽度 (mm)	Standard Rim (10km/h) 标准轮辋 (kg)	Standard Rim (10km/h) 标准轮辋 (Kpa)	Standard Rim (50km/h) 标准轮辋 (kg)	Standard Rim (50km/h) 标准轮辋 (Kpa)
27.00R49	★★	19.50/4.0		E-4	HA-710	740	2690	82	895	1228	868	45000	800	27250	650
	★★	19.50/4.0		E-4	HA-162										
	★★	19.50/4.0		E-4	HA-163										
	★★	19.50/4.0		E-4	HA-166			69							
30.00R51	★★	22.00/4.5		E-4	HA-168	845	2878	75	1005	1290	990	56000	800	33500	650
33.00R51	★★	24.00/5.0		E-4	HA-162	920	3030	95	1080	1357	1065	65000	800	38750	650
	★★	24.00/5.0		E-4	HA-710										
36.00R51	★★	26.00/5.0		E-4	HA-162	990	3194	92	1183	1428	1159	80000	800	46250	650
	★★	26.00/5.0		E-4	HA-168			83							
37.00R57	★★	27.00/6.0	29.00/6.0	E-4	HA-169	1050	3440	93	1242	1550	1225	82500	800	53000	725
	★★	27.00/6.0	29.00/6.0	E-4	HA-163			99							
	★★	27.00/6.0	29.00/6.0	E-4	HA-162										
40.00R57	★★	29.00/6.0	32.00/6.0	E-4	HA-369	1130	3560	78	1380	1605	1345	100000	800	60000	725
	★★	29.00/6.0	32.00/6.0	E-4	HA-566			85							
	★★	29.00/6.0	32.00/6.0	E-4	HA-162			99							
	★★	29.00/6.0	32.00/6.0	E-4	HA-168			93							
	★★	29.00/6.0	32.00/6.0	E-4	HA-368										
46/90R57	★★	29.00/6.0	32.00/6.0	E-4	HA-569	1180	3560	85	1467	1598	1440			63000	700
	★★	29.00/6.0	32.00/6.0	E-4	HA-368			99							
	★★	29.00/6.0	32.00/6.0	E-4	HA-162										
50/80R57	★★	34.00/5.0		E-4	HA-569	1266	3620	85	1583	1572	1554			73000	600
	★★	34.00/5.0		E-4	HA-993			95							
	★★	34.00/5.0		E-4	HA-162										
53/80R63	★★	36.00/5.0	38.00/5.0	E-4	HA-688	1330	3780	85	1678	1639	1625			82500	600
55/80R57	★★	44.00/5.0	42.00/5.0	L-5	HA-860	1428	3738	118		1623.4	1743	100000	650		600
59/80R63	★★	44.00/5.0		E-4	HA-686	1480	4026	88	1870	1730	1803			100000	600

HA162

花纹特点：

1. 该花纹是在 HA166 花纹的基础上进行的优化；
2. 更深的花纹沟，更大的花纹块面积，使得该花纹具有良好的刹车性能和耐磨性能；
3. 肩部宽大沟保证了轮胎具有较好的耐热性能；
4. 适用于各种矿区。

Characters：

1.HA162 is upgraded based on HA166 pattern;
2.The deeper grooves and huger tread blocks help tire owns better braking performance cut resistance;
3.The design of wide grooves in the shoulder help it owns better heat release;
4. Applicable to all kinds of mining area.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
27.00R49	★★	19.50/4.0	82	500
33.00R51	★★	24.00/5.0	95	565
36.00R51	★★	26.00/5.0	92	632
37.00R57	★★	27.00/6.0	99	880
40.00R57	★★	29.00/6.0	99	805
46/90R57	★★	29.00/6.0	99	898
50/80R57	★★	34.00/5.0	95	980

HA163

花纹特点：

1. 该花纹是在 HA162 花纹的基础上进行的优化；
2. 冠中宽大的花纹块保证了轮胎具有更大的接地面积；
3. 该花纹具有优越的抗刺扎、耐磨性能及更长的使用寿命；
4. 适用于矿石硬度大、路面恶劣的矿区。

Characters：

1.HA163 is upgraded based on HA162 pattern;
2.The huge tread blocks in the center of crown ensure it has a greater contact area;
3.HA163 owns better puncture resistance and wear resistance which leads to a prolongedservice life;
3.The design of wide grooves in the shoulder help it owns better heat release;
4. Applicable to high hardness and poor mining condition area.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
27.00R49	★★	19.50/4.0	82	450
37.00R57	★★	27.00/6.0	99	825

HA166

花纹特点：

1. 适用于铁矿、铜矿等恶劣矿山环境；
2. 中央曲折开放花纹，保证轮胎具有良好的散热性能；
3. 轮胎具有良好的耐磨性能和耐刺扎性能。

Characters：

1.Applies in any tough mine environment, such as iron ore mine, copper mine etc;
2.The centric curve pattern guarantees better heat dispersion;
3.Good wear resistance and puncture resistance.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
27.00R49	★★	19.50/4.0	69	525

HA168

花纹特点：

1. 大面积花纹块，赋予了轮胎的良好的抓地性能及抗刺扎性；
2. 宽大的横向沟具有良好的自洁性能；
3. 全支撑肩部，轮胎转弯最小变形。

Characters：

1.The huge tread blocks help tyre owns better road holding and cut resistance;
2.The wide horizontal groove improves heat dispersion and self-cleaning;
3.The full support design of tyre shoulder ensures the minimum crown deformation.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
30.00R51	★★	22.00/4.5	75	588
36.00R51	★★	26.00/5.0	83	814
40.00R57	★★	29.00/6.0	93	915

HA169

花纹特点：

1. 适用于铁矿、铜矿等恶劣矿山环境；
2. 中央曲折开放花纹，保证轮胎具有良好的散热性能；
3. 轮胎具有良好的耐磨性能和耐刺扎性能。

Characters：

1..Applies in any tough mine environment, such as iron ore mine, copper mine etc;
2.The centric curve pattern guarantees better heat dispersion;
3.Good wear resistance and puncture resistance.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
37.00R57	★★	27.00/6.0	93	910

HA368

花纹特点：

1. 宽大的花纹块设计，使轮胎具有良好的抓地力和抗刺扎性能；
2. 优异的行驶性能，减少不均匀磨耗；
3. 良好的散热及抓地性能，具有超强的里程寿命，高耐磨和抗刺扎；
4. 能有效降低矿石对轮胎的刺伤。

Characters：

1. The design of wider tread lugs contribute to better road holding and cut resistance;
2. Good driving performance reduces the uneven wear;
3. Heat dissipation and road holding makes longer lifetime and wear/cut resistance;
4. Reduce the cutting from rock.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
40.00R57	★★	29.00/6.0	93	930
46/90R57	★★	29.00/6.0	85	990

HA369

花纹特点：

1.65% 左右的花纹块面积设计，保证了轮胎具有良好的磨耗性能和抗刺扎性；
2. 具有优异的散热性能；
3. 轮胎冠部中心直沟采用了半深度设计，在提高中心部位散热效果的同时，保证了轮胎冠部中心变形的最小化；

Characters：

1.Adopt the advantages of HA366&566, which has about 65% of lugs covering to guarantee the wear ability and cut resistance;
2. Good heat dissipation;
3. The center in crown adopt half-deep design make tyre has better heat release ability and minimalize the tread rubber moving in center.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
40.00R57	★★	29.00/6.0	78	1020

HA566

花纹特点：

1. 宽大的花纹块设计，使轮胎具有良好的抓地力；
2. 肩部花纹采用大块支撑，保证轮胎在行驶过程中均匀磨耗；
3. 轮胎冠部中心设计保证了轮胎在使用中有更好的散热效果。

Characters：

1. The design of wider tread lugs contribute to better road holding.The bigger proportional tread block of HA566 make sure that tyre has better wear-resistance and longer tyre life;
2. The tyre shoulder strengthen huge block to guarantee tyre running much stable and reduce the friction;
3. In the center of tyre crown, we apply Longitudinal and transverse groove and good for heat dispatching.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
40.00R57	★★	29.00/6.0	85	980

HA569

花纹特点：

1. HA566 花纹的改进型，更好的耐磨性；
2. 轮胎行驶生热低；
3. 中央大块花纹连接保证了轮胎冠部中心变形的最小化，肩部花纹采用镂空设计，提高了轮胎肩部的散热效果。

Characters：

1.HA569 is upgraded based on HA566 pattern, to achieve a better running performance and wear resistance;
2.Lower heat generation;
3.Centric connected pattern ensures the minimum deformation of tyre crown, hollow design in tyre shoulder improves the heat dissipation.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
46/90R57	★★	29.00/6.0	85	1035
50/80R57	★★	34.00/5.0	85	1207

HA686

花纹特点：

1. 宽大的花纹块设计，使轮胎具有良好的抓地力；
2. 良好的耐磨性能；
3. 飘逸曲线花纹；
4. 适用于各种矿山和路况。

Characters：

1. Wider tread volume provide better running traction;
2. Better wear duration;
3. Spreading lugs generate fascistic looking;
4. Applicable for various mine conditions.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
59/80R63	★★	44.00/5.0	88	1476

HA688

花纹特点：

1. 全新的设计使轮胎具有出色的自洁能力；
2. 大的花纹块为轮胎提供了更好的抓地力和耐切割性能；
3. 良好的通过性能；
4. 适合各种矿山环境和路况。

Characters：

1.Brand - new pattern design make it own excellent self - cleaning ability;
2.The huge tread blocks help tyre owns better road holding and cut resistance;
3.Perfect running capability;
4.Suitable for different mine condition and road condition.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
53/80R63	★★	36.00/5.0	85	1277

HA710

花纹特点：

1. 良好的通过性能；
2. 优异的自洁性能；
3. 适用各种泥泞矿山路况。

Characters：

1. Perfect running capability;
2. Good self cleaning ability;
3. Suitable for different mine condition and muddy road.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
27.00R49	★★	19.50/4.0	82	514
33.00R51	★★	24.00/5.0	95	625

HA860

花纹特点：

1. 为装载机轮胎，胎面为超深型花纹 L5，深度达到 118mm；
2. 使用寿命长，采用多层钢丝加强的结构设计，很好的保护了胎侧；
3. 外观设计适合安装防护链，轮胎适用于多种车型。

Characters：

1.The loader tire tread is designed as ultra-deep L5 , tread depth reaching to 118mm;
2.Long pattern life design and multi-layer steel wire reinforce the structure, with good sidewall protection;
3.Profile design is suitable for external protective-chain installation, providing good various vehicle fit.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
55/80R57	★★	44.00/5.0	118	

HA993

花纹特点：

1. 花纹块比例大，抓地力强，
   具有良好耐磨性；
2. 良好的耐切割性能；
3. 适用于各种泥泞矿山和路况。

Characters：

1. Wider tread volume provide better running traction and higher wear resistance;
2. Better cut resistance;
3. Applicable for various mine conditions even rough mud haul-road.

规格 Size	星级 Star Rate	标准轮辋 Rim	花纹(mm) OTD(mm)	标准型 TKPH
50/80R57	★★	34.00/5.0	85	1170

4 轮胎的应用
Tyre 's Application

海安子午线工程轮胎主要用于巨型矿用自卸卡车，用于露天矿的废料和矿石运输。不同的轮胎型号，具有不同的轮胎承载能力。下表是海安公司推荐的轮胎规格及其配置的卡车：

Haian OTR tyre are mainly applies in giant dump trucks to transport waste and minerals, Tyre load capacity are different with different sizes.

Table: Recommended Tyre Size for Dump Trucks

轮胎规格 Tyre Size	单胎载荷 Load per Tyre (ton)	卡车负荷 Load Capacity (ton)	卡车应用例子 Dump Truck Example
27.00R49	27.25	100	CAT777, TR100, BELAZ-7557
30.00R51	33.5	115	CAT777, SF31904C
33.00R51	38.75	135	CAT785D,BELAZ-7513
36.00R51	46.25	150	BELAZ-7517, MT3600, EH3000
37.00R57	53	170-190	730E,CAT789C, EH3500
40.00R57	60	190-220	730E, CAT789C, BELAZ-7530
46/90R57	63	220-240	793D,830E,T262,MT4400, BELAZ-7530,7531
50/80R57	73	220-260	MT4400, 930E, BELAZ-7530,7531
53/80R63	82.5	280	930E,EH5000,MT5500
55/80R63	92.5	320	BELAZ-75600,CAT795F
56/80R63	95	330	MT5500AC, Komatsu 960E, Liebherr T282C
59/80R63	100	360	CAT797, BELAZ-7560

轮胎规格：

如：46/90R57（工程机械轮胎）
46------- 名义断面宽代号 46 英寸
90------- 轮胎横截面的高宽比为 90:100
57 ------ 名义轮辋直径代号 57 英寸

特点：接地面积和平均压力良好，适用于不平整及 硬土质路。

用途：用于大型自卸车，亦用于大型装载机。

Tyre Size：

Eg，46.90R57（OTR Tyre）
46------- Section width is 46inch
90------- Tyre Aspect Ratio is 90:100
57 ------ Nominal Rim Diameter is 57inch

Characters: Good ground contacting and even press which is suitable for rough and hard road.

Application: Fitted on giant dump trucks and operated on front-end loader

第二部分

轮胎的日常维护和技术服务

Part II

Tyre Daily Maintenance and Technical Services

1 轮胎的搬运 Tyre Delivery

当使用叉车搬运轮胎时，需注意：

◎轮胎运输和装运过程中，将轮胎垂直立起，叉车平行穿越轮胎中央空位；

◎叉把最好是圆形的，且直径应该至少大约 15 厘米的直径；

◎平板叉车的插把最好不要用方形的，因为方形边沿过于尖锐，会损坏轮胎。

Cautions for tyres transportation by forklift:

◎Put the tyre vertically across the fork;

◎Use a round fork with diameter not smaller than 15cm;

◎Square holders may damage the tyre tread, and it 's forbidden to insert a flat fork inside a tyre.

当使用吊车搬运轮胎时，需注意：

◎使用呢绒或者橡胶绳索穿过吊钩；

◎使用的吊钩够粗，至少大约 15 厘米左右的直径以保证轮胎上的橡胶不受损坏；

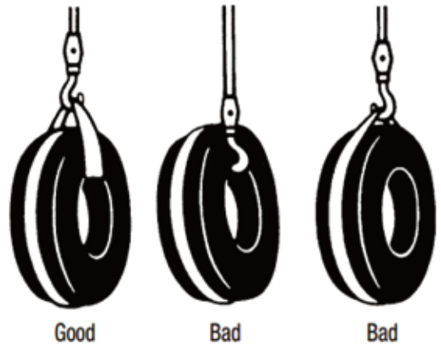
◎请勿把吊钩直接插进轮胎子口进行吊运。

When lifting tyre by crane:

◎Using the nylon or rubber sling through the hook;

◎The hook should be strong enough (with at least 15cm diameter) to protect the tyre tread;

◎Do not insert the hook in tyre bead directly for transportation.



告：

海安公司提醒用户：贵司必须由受过严格训练的专业人员用专业工具按照专业的流程进行操作(三专业：专业人员、专业工具、专业流程)。若没有按照规定程序进行，易引起轮胎或轮辋的错误安装，导致轮胎事故，轻者设备损伤，重者人员伤亡。

Warning：

Haian company reminds you that all tyre delivery should be operated only by trained worker using specialized tools according professional procedures. If you fail to comply with these procedures, it may result in fault position of the tyre and/or rim, and cause the big accident.

轮胎的安装 Tyre Mounting 2

1. 安装轮辋　1.Rim Installation

2.轮胎装上轮辋　2. Put tyre onto the rim

3. 安装法兰　3.Mounting Flange

安装前：

◎保持轮胎及轮辋等各个部位的清洁；
◎除去包装，并且检查轮胎是否有损坏检查轮辋的状况和相关部件的情况，清除污物和腐蚀物质，特别小心地清洁凹槽处；
◎每次换置轮胎需要配用崭新的 O 型密封圈；
◎必须在专业的轮胎装卸站点进行轮胎的更换，以确保轮辋部件的负荷分配稳定、均匀；
◎轮胎内部必须是干净和干燥的。

Before Mounting:

◎Clean all components of the tyre, rim and valve;
◎Remove the packages and inspect all parts of tyre and rim. Completely cleaning of dirt and corrosives, especially in the grooves;
◎For each tyre replacement, new O-ring are requested;
◎Tyre replacement should be operated on designated tyre bay to make sure the rim parts are load stable and even;
◎Keep the tyre internal clean and dry.

轮胎安装基本步骤：

◎首先检查轮辋、法兰、锁圈有无裂纹及变形，清除以上部件的污垢为组装轮胎作准备；
◎将轮辋固定在十字铁 / 木架上；
◎清理轮辋表面的铁锈（提示：轮辋的锁圈槽和密封圈槽应清理非常干净）；
◎更换气门座的密封圈和检查气管是否畅通；
◎对轮辋指定部位涂抹轮辋油 (提示 : 应均匀涂抹)；
◎对要组装的轮胎清除内部的水以及其它杂质；
◎对轮胎的上下胎圈均匀涂抹轮辋油；
◎将轮胎用机械手套在轮辋上以及将清理干净的上法兰套在轮胎上面；
◎将压圈放入并均匀敲打使之露出密封圈槽；
◎将密封圈套入密封圈槽内（提示：发现密封圈未全部进入槽内时应用小撬棍将密封圈推入槽内切勿用手）；
◎将锁环用大锤敲击使之进入锁圈槽。

ounting Steps:

irstly make sure no cracks & deformation of rim, flange and the lock ring,clean the components;
◎Fix the rim stable on the brandreth;
◎Clean the rusty on the rim(Keep grooves in lock ring and seal ring very clean);
◎Replace the valve seat and seal ring and make sure the air tube are unblocked;
◎Evenly oil the rim;
◎Clean any dusty or water inside the tyre;
◎Paint the rim oil on the beads.

◎Put the tyre onto the rim base and cap the flange on the tyre;
◎Clapse the pressing ring and press it in line with the out surface;
◎Put the seal ring into the groove (Note: Do not touch the real ring by hands if you find the ring wasn ' t inserted completely, but you can use crowbar);
◎Ensure the lock ring hammered in the groove of lock ring.

充气时：

◎轮胎充气或轮胎内部还有气压的时候，不得将密封圈或者其他部件放置在轮胎上；
◎充气前重新确认所有的部件已安装妥当；
◎必须在配有特殊护栏的卸胎站点进行，以确保轮胎装置爆炸或者轮胎充气胶管爆炸等发生时，有安全保护；
◎工作人员不得坐在轮胎及轮辋上面或者站在正在充气的轮胎或轮辋前面。以防配件一旦飞弹出，人员被击伤，乃至死亡；
◎不得在轮胎上或轮胎附近进行焊接或燃烧东西，以防高温引起轮胎压力骤增导致胎爆。

Inflating:

◎Do not leave O-ring or components on the tyre when inflation;
◎Make sure all components are fitted correctly before inflation;
◎All inflating procedures should be operated within safety zone where there is protective fence to avoid the hazard of tyre burst or air tube burst;
◎Never sit on or stand in front of tyre or rim. Serious hurt even dead may occurs if the parts fly apart with explosive force;
◎Never attempt to weld or fire on or near a tyre/rim assembly. Heat from these activities may result in explosion of tyre due to sharp rising of pressure.

安装后：检验轮胎与轮辋之间的气密性

◎确保安装在轮辋上轮胎的每个位置没漏气，包括气密层、胎圈底部、O 型圈、气门嘴及气门帽；
◎轮胎水平放置，保护圈朝上，在轮辋的槽内灌入肥皂液。

After Mounting: Checking the air-tightness between tyre & rim.
◎Ensure every parts below are tight enough：inner liner, bead seat, O-Ring, valve stem and valve cap;
◎Place the tyre horizontally and the lock ring upwards, then insert the soap water into the groove of the rim.

3 轮胎的拆卸 Tyre Demounting

拆卸前注意事项：

◎在移除任何轮胎部件如螺丝、钢圈压板等之前，须确保轮胎内部的空气已经排尽；
◎确保拧开气门嘴，让胎内空气全部排出，以防因轮胎气压的压力导致车的钢圈等部件飞出；
◎可用铁丝插进气门嘴，确保已清理气门芯里面的异物，以防气门嘴被堵。

Precautions before Demounting:

◎Make sure there's no air in tyre before removing any components such as nuts, rim clamps, etc;
◎Open the valve stem to make sure all air is exhausted;
◎Insert a steel wire to the valve stem to make sure it isn ' t blocked.

拆卸流程：

移除的顺序：锁圈—胎圈座压箍—压圈—轮辋基体

1. 在卸下轮胎后，缓缓将它放下；
2. 将撬杠插入到锁圈和胎圈座箍之间，撬起锁圈，在其周围制造出一个缺口；
3. 使用轮胎撬杠将锁圈从轮胎中撬出；
4. 使用轮胎撬杠移开 o 型圈；
5. 将勾架和千斤顶插入到胎圈座箍和压圈之间；
6. 使用千斤顶在胎圈座箍和压圈之间撬出间隔缝隙；
7. 用钢丝栓好胎圈座箍两端，往外吊出胎圈座箍；
8. 移开压圈；
9. 在移去胎圈后，将轮胎翻转过来，移去轮辋。

Demounting Process:

Process：Lock rim—Bead seat band—Side ring—Rim Base

1. Slowly put down the tyre with a crane after demounting;
2. Insert the lever between the lock and bead seat, pry the lock to get a gap around it;
3. Pull out the lock ring with the crow bar;
4. Remove the O ring;
5. Insert hook & jack between bead seat and side ring, and jacked a gap;
6. Fasten the two tops of bead seat band with a steel wire, then hand it out with forklift;
7. Remove the flange;
8. After removing the bead, turn the tire over with the crane and remove the rim.

拆卸时：

◎在使用有液压气压的工具拆卸法兰时，要站在轮胎的一侧，保持手指干净，一手要握紧工具，以防工具脱手弹出伤人；

◎不要在法兰的对接焊缝附近使用工具。

During Demounting:

◎When apply hydraulic pressure to unseat rim flange, keep your finger clean and always stand by and hold the tool with one hand tightly(If the tool slops, it may cause injury by the tools);

◎Never use the tool near the flange.

拆卸后：

◎清理轮辋及附件的杂质油污等，以防对轮胎检查或者轮胎安装时产生不利影响。

◎必须高度注意已将轮胎锁圈和沟槽清理干净。这样保证锁圈安装的安全。

After Demounting:

◎Clean rims and repaint chipped areas to prevent the detrimental effects by corrosion.

◎Be extremely careful to clean all dirt and rust from the lock ring and groove, which guarantee the safety of lock ring.

4 轮胎的搭配
Proper Tyre Selection

为了保证轮胎的最大使用性能，自卸车的后轴车轮必须装配统一尺寸和型号的轮胎。前轮的轮胎也必须安装相同型号的轮胎。自卸车如果需要更换磨损轮胎，必须根据轮胎外径进行选择。同一尺寸的轮胎不能超过下表所指定的值。

To maximize tyres ’performance, the rear axles of dump trucks should be equipped with tyres of the same sizes and model. The front axle must not be equipped with different models of tyres. If new tyres to be mounted on dump trucks to replace the worn ones, you should strictly refer to the tyres ’outer diameter to choose tyre. The dimension of tyres should not exceed data specified in below chart.

轮胎规格 Tyre Size	尺寸允许的误差范围 Deviation Limit	
	外直径 Outer Diameter	周长 Circumference
轮辋直径≥49 英寸 Rim Dia≥49inch	≤24mm	≤75mm

轮胎安装在轮辋上后，并充气到（推荐的）工作压力，轮胎外直径的测量以轮胎周长为准，周长的测量是用卷尺测量胎面中心线。需要注意的是，双轮胎具有相同的总直径。否则，较大直径的一方将承担大部分负荷，会更容易损坏和磨损。如果外径差异非常大，较小的轮胎容易打滑和刮伤，导致胎面迅速磨损．一般来说，较大的轮胎会因为压力较大而导致热剥离。

When tyres are mounted on the rim and inflated the tyre up to the recommended working pressure, the measurement of the outer diameter of tyres is subject to the tyre circumference. Circumference is measured with a tape to measure the centerline of tread.It is essential that dual tyres have the same overall diameter. Otherwise the one with larger size will carry most of the load and will be prone to damage and wear. If the difference in outer diameter is extremely large, the smaller tyre slips and scrapes along the ground, causing the center of the tread to wear quickly. Generally speaking, the larger tyre will be heat separated due to overloading.

已经装在车辆上的轮胎的尺寸通过如下步骤测量：

1. 首先检查胎压是否达到标准；
2. 用一个方形装置把装在一起的两条轮胎给箍住（如图一），或者如图二所示，拉紧两条轮胎之间的绳线，检查他们的半径是否一致。

Process of measuring tyre dimensions on truck:

◎Firstly, check the tyre inflation is standard or not;

◎Secondly, measure whether the dual diameter is the same, by placing an angled square across two tyres as Fig.1, or tightening the cord of two tyres like Fig.2.

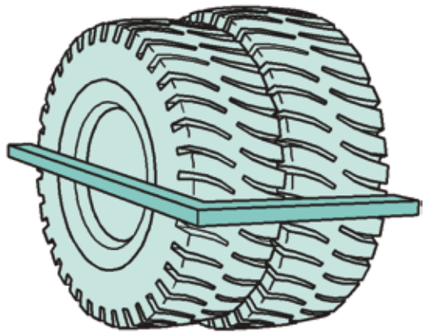


Figure one

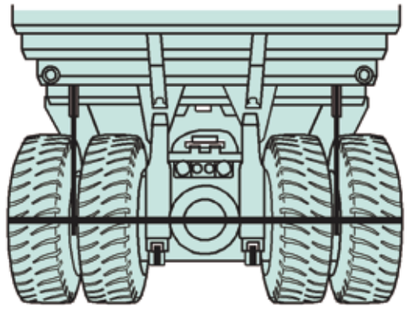


Figure two

★注意

◎不允许把子午线轮胎和斜交轮胎并装；
◎为了安全行驶，严禁把修补、翻新后的轮胎安装在前轮；
◎前轮剩余花纹磨至 2/3 时，需倒位到后轮使用。

★ Notice:

◎For safe driving, it's strictly forbidden to mount radial tyre and bias tyre together;
◎Never mount the repaired tyre or retread tyre in front position;
◎Please rotate the front tyre to the rear position when the tread wear over two thrids of its OTD.

5 轮胎的气压 Tyre Pressure

轮胎‘冷’气压，是指当轮胎温度与环境相同时，符合标准所规定的轮胎气压。

为获得最佳的轮胎性能，适当的充气压力必不可少。过度膨胀和充气不足都会使轮胎寿命缩短，并可能导致轮胎故障。精确的充气压力取决于车辆，地面情况，负载，速度和其他因素。

"Cold" pressure means the standard tyre pressure when tyre temperature is the same as ambient temperature

In order to get the best performance, the tyre must be kept with the suitable inflation. Both over-inflation and under-inflation will shorten the tyre running life, also may cause the malfunction. Proper inflation depends on the vehicle, ground conditions, load, speed and other factors

压 Under-Inflation　　中 Proper　　压 Over-Inflation

超压的后果：

◎加大地面接触压力，造成胎面过度磨损；
◎减少对路面不平的冲击保护，导致由于切割或冲击造成的损坏；
◎加大对钢丝圈的压力，增加钢丝圈损坏的可能性；
◎容易打滑，乘坐不适。

Results of Over-inflation:

◎Increase ground contact pressure at the center of the tread, causing excessive wear there;
◎Reduce protection of the cord against shock from uneven road surfaces, resulting damage caused by cuts or shock;
◎Excessive pressure is exerted on the beads, increasing the potential of beads bursting;
◎Easy to slip and uncomfortable riding.

低压的后果：

◎加快漏气，产生热量，导致轮胎过早报废；
◎胎面和帘布分离；
◎加快帘线损耗，导致帘线破损；
◎胎侧变得容易破裂；
◎胎面磨损不均匀，加速裂口；
◎轮辋裂开，导致无内胎轮胎漏气。

Results of Under-inflation:

◎Accelerate leakage, generate heat, which leads to early tyre scrap;
◎Tread separates from cord fabric, cord fatigue is accelerated, leading to broken cord;
◎Sidewalls become susceptible to rupture;
◎Tread wear is uneven and radical cracks develop;
◎Rim splits, creating air leaks in tubeless tyres.

使用的气体 - 空气或氮气：

◎使用普通的室外空气是最常用的的充气方法，也适用于绝大部分的环境状况。需注意的是：若用空气来充气，则空气压缩机的输出速度至少 43m²/ 小时，且至少 12kgf/cm² 的压强；
◎使用氮气充气主要是为了避免轮胎内部的氧化或炸开的潜在危险。氮气是一种不可燃的中性气体，因为氮气充压使得轮胎内部没有氧气成分，氧化活动和爆炸的可能就大为降低。

Inflation with Air or Nitrogen:

◎Inflation with air is the most common method, it's also suitable for most applications. Attention that the compressor must have sufficient output 43m³/h and a minimum pressure of 12kgf/cm²;
◎Nitrogen can be used depends it's a kind of incombustible gas, it makes no air in tyre when inflation, which is greatly reduce the potential risk of combustion and explosion.

注意：

◎在操作过程中轮胎内热量积聚使得气压上升，这是正常现象。不同轮胎的上升压力不同，尤其对连续操作中使用的轮胎要特别注意。在操作结果中，若因热量上升使充气内压上升大于 25%，则应复查冷充气内压。如果冷充气压力显示是正确的，必须减慢行驶速度和减少负载。否则，过热可能会导致轮胎热剥离；
◎轮胎在操作运行中，不可因气压增高而做泄气处理。减少充气内压可能会引起内部温度上升，导致轮胎故障；
◎如有必要，需定期检查和校准充气内压；
◎气门嘴应始终保持紧闭，如此可保持空气封闭，使轮胎免受泥土和灰尘的侵蚀。

Note:

◎It's normal that pressure rise due to heat build-up, different tyre has different rising pressure. If heat generated during operation results in a rise of 25% or more in inflation pressure, the cold inflation pressure should be rechecked. If the cold inflation pressure shows to be correct, either truck speed or load must be reduced. Otherwise, overheat may cause tyre separation;
◎It's forbidden to deflate air to lower the internal pressure during tyre running. Reducing inflation pressure will cause the internal temperature rise, leading to tyre failure;
◎Inflation pressure should be checked and calibrated periodically;
◎Valves should always be capped, this keeps mud and dust out of the valve core and protects the air seal.

6 轮胎的速度 Truck Speed

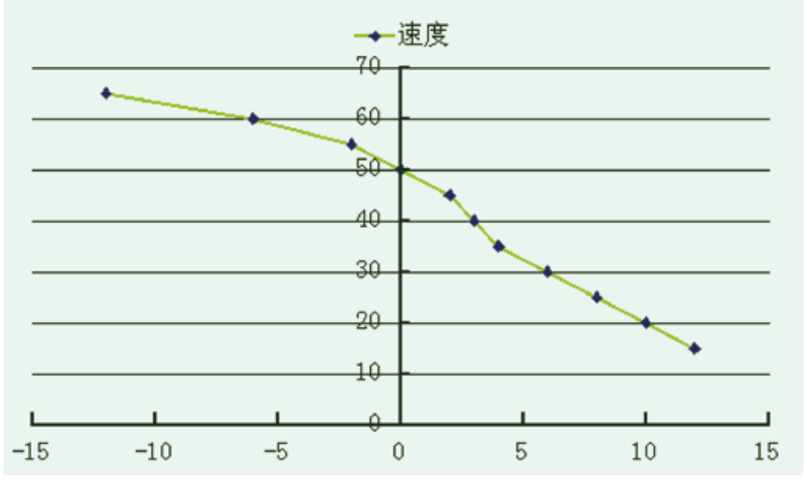
海安轮胎的建议最高行驶速度上限为50km/h。过快会使轮胎内部温度过高。卡车司机需要特别注意。车辆有两种速度的限制：实际的可达到的最大速度和平均运行速度。平均可持续运行速度受 TKPH 限制 (参见下一节).

Haian recommends that the maximum truck speed is 50km/h.and excessive speed will produce abnormally high temperature in tyres. There 're two speed limitations: the actual maximum speed that the vehicle can attain and the average operating speed that the vehicle can sustain. The average operating speed is limited by the tyres' ton - mile - per - hour (TKPH) rating.(Please see more details in TKPH chapter)

表：因卡车超速可能引起的轮胎损害
Damage Caused by Excessive Speed

现象 Phenomenon	造成损害 Resulting Damage
轮胎内部升温 Higher heat generation inside tyre	热剥离 Heat separation
突然刹车次数增加 Increased abrupt braking	崩花，子口损伤，轮胎寿命降低 Chipping, Bead damage, Shortening tyre life
转弯 Sharp cornering	不规则磨耗，快速磨损，子口损坏 Irregular wear, Quick abrasion, Bead damage
撞地面异物 Frequent collision with obstacles on the road	被切割，撞爆，刺破 Cutting, Cut-impact break, Punctures

轮胎的负荷能力受车辆的最大速度影响，具体如下：
Relation between Speed and Load:

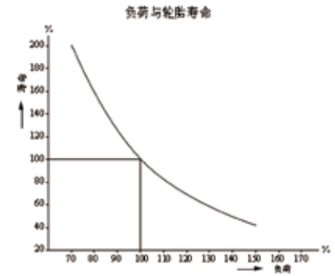


载重变化比例 Ratios of Load change

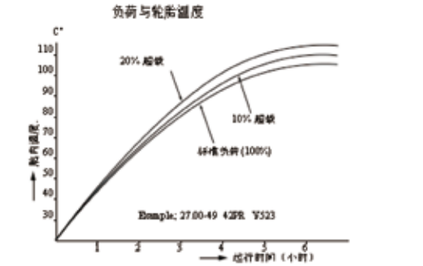
7 轮胎的载荷 Tyre Load Capacity

负荷过大会缩短轮胎寿命，并可能导致过早报废 . 为获得最佳的轮胎性能，不应超出规定的最大负荷 . 如果负载超过规定容量的轮胎，则应使用更高层级别的轮胎。

Overloading will shorten tyre life and increase the chance of early tyre scrap. For the best tyre performance, the maximum recommended load should not be exceeded. If the load exceeds the standard, a tyre with a higher level should be used.



负荷与轮胎寿命 Load and Tyre Life



负荷与轮胎温度 Load and Tyre Temperature

超载的后果：

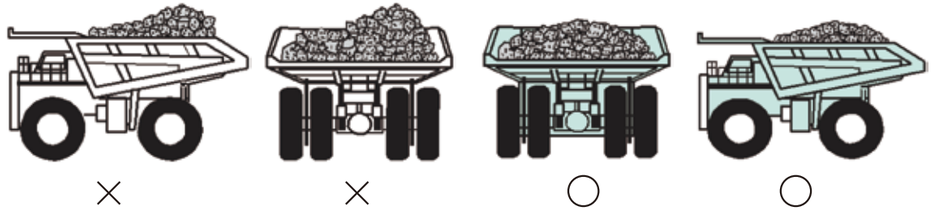
1. 产生过多热量引起热剥离；　2. 轮胎变形过大导致帘线断裂；　3. 胎面与路面的摩擦增大，加速磨损；
4. 增加钢丝圈负荷，易损坏；　5. 帘线张力增大，加大爆裂可能。

Results of Overloading:

1.Generate excessive heat and cause heat separation;　2.Excessive tyre deformation causes broken cords;
3.Rapid wear due to excessive tread movement against road surface;
4.Bead ring failure due to excessive bead movement;　5.Risk of bursting due to increased cord tension.

为了确保轮胎不超载，考虑矿山、矿区、挖掘点的地理特征，根据轮胎用户准备的装运表，自卸车上的物料必须均匀地分布（如图）。

To avoid tyre overloaded, it's also important to consider the environmental factors of mine site, like the conditions of mine diggings area, and according to the load sheet provided by tyre user, the material should be evenly distributed on the truck. (see the left Fig.)



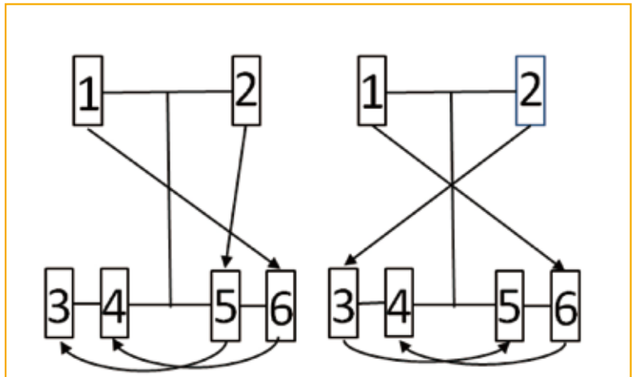
载重注意事项 Correct Distribution

8 轮胎的换位 Tyre Rotation

◎轮胎适时换位、选用合适的花纹、日常勤维护、定期检查胎压、及时修补并且勤挖胎纹中的石子、异物等都是延长轮胎寿命的重要因素；

◎轮胎经过一段时间使用后，受到路面拱度、刹车制动和轮胎装配位置不同等因素的影响，会促使胎面磨耗产生较大的差别，因此，必须做到及时换位装配，使每条胎在各个位置上都能轮流一次，各胎所承受的负荷大致相同，以解决轮胎偏磨和延长使用寿命的问题；

◎轮胎换位的方法，常用的有“ 交叉换位 ”和“ 循环换位 ”两种。但一经选择确定后，每次应按原确定后的换位方法进行，不要中途改变。



交叉循环示意图 Crossover Rotation

循环换位 Cycling Rotation

◎Change the tyre position in time is one of key points to increase the tyre life;

◎When the tyre used for a period of time, the tread wear on different parts will be different due to the road chamber, brake position and fitted position. This will lead to uneven tyre wear. So it is important to rotate the tyre to make each tyre bear the same load.This is to solve the uneven wear of tyre and increase the tyre life;

◎There are two major methods for rotation, cross over rotation and cycling rotation. When you choose a method, you should rotate tyre to the end and never change the method during the rotation.

注意：

1. 凡整车更换轮胎的车辆，可以采取以上换位法；
2. 凡新旧轮胎混装时，新胎或较好轮胎固定装前轮，旧胎或翻新轮胎固定装后轮，则采取左右换位，内外挡换位等办法；
3. 凡换位后改变原有滚动方向时，应将轮胎进行反面调位（即调换装车位置、滚动方向），这是减少以至消除轮胎偏磨倒角和胎肩单边疲劳过度的措施，也是一项延长轮胎使用寿命和提高翻新率的途径；
4. 后轮使用过的轮胎一般不再倒位到前轮使用。

Note:

◎For the tyres in one truck, you can choose any method above;

◎For the truck with old and new tyre, it is recommended to fit the new one in front position. For the used tyre, it is advised to fitted in rear position and rotation within rear four positions;

◎When one tyre changes the rolling direction after rotation, you should change the tyre position and adjust to the opposite way. This is to decrease the uneven wear, reduce the part tread fatigued and increase the tyre life;

◎The tyre used in rear position won ｔ be rotated to front position.

9 TKPH 值 TKPH Value

为了能更为迅速、更远距离的运输重物，矿山方面不断要求增加产能，所以，这些沉重的搬运不可避免地导致轮胎内部温度的升高。由于轮胎耐热性的有限，因此必须明确轮胎的额定工作量。即规定轮胎在特定作业环境下作业，以避免轮胎出现高温。

The mine site are prone to transport more and run faster to rise its output. Inevitably, tyre internal temperature will rise due to heavy loading. Tyre has heat - resistance limitation, it is essential to define a rated load. Tyre should run under operated conditions to avoid high temperature.

轮胎在矿场的工作能力由 TKPH 值来衡量：

轮胎工作能力 TKPH‘ 每小时吨公里 ’数据是通过以下方法计算的：

TKPH =Qav ×Vav

Qav –表示平均轮胎负载 =1/2 [(空车) + (负载车)]

Vav – 表示自卸车的平均工作速度 =[(往返距离) x (运行次数)] /(出发到结束的时间)km/h

Qav =1/2 (Qp + Qz)
Qp – 表示空车时轴负荷，单位 kg;
Qz – 表示车辆有负载时的轴负荷，单位 kg.

Vav. = (2L× n)/ t
L = 单程运输距离，单位 km
n = 来回趟数
t = 自卸车总的工作时间，单位小时

当环境温度高于 38°C时，TKPH 值的计算必须按照以下公式进行修改：

$$TKPH = \frac{TKPH\ nom}{1 + (Ta - Tnom) * 0.0096}$$

TKPH nom = 名义 KTPH 值
Ta = 实际环境温度
Tnom = 名义 TKPH 值下的名义环境度

Working capacity of OTR tyres is calculated by "Ton - kilometer per hour" (TKPH), :

TKPH =Qav ×Vav

Qav= average tyre load, =1/2 [(empty truck) + (loaded truck)] in kg

Vav = average working speed =[circle distance X number of round trips]/ Total working time , in km/h

=1/2 (Qp + Qz)
Qp = axle load of an empty dump truck, in kg
Qz = axle load in a loaded dump truck, in kg

av = (2L× n)/ t
L = single distance, in km
n = number of runs
t = total working time of a dump truck, in hours

he ambient temperature is higher than 38°C, the formula for TKPH calculation should be adjusted as following,

$$TKPH = \frac{TKPH\ nom}{1 + (Ta - Tnom) * 0.0096}$$

KPH nom = nominal TKPH value
Ta = actual air temperature, in °C
Tnom = nominal air temperature

如：计算最大工作能力的例子

27.00R49(E-4) 的 TKPH 值计算
自卸车的负荷情况：

Example for the calculation of maximum working capacity

TKPH of tyre 27.00R49(E-4)
Load of a dump truck

平均轮胎负载（kg） Load per tyre（kg）	前轴 Front axle	后轴 Rear axle
空车Empty Truck	14480	8500
装货Loaded Truck	25320	25320

那么前轮平均每条轮胎负载
Qav = 0.5(14480+25320)＝19900(Kg)
自卸车的平均作业速度，km/h

Average tyre load
Qav = 0.5(14480+25320)＝19900(Kg)
Average working speed of a dump truck, km/h

$$Vav = \frac{2L \times n}{t}$$

$$Vav = \frac{2L \times n}{t}$$

L – 运输距离，km (6.45km)
t –车总工作时间，小时数(24 小时)
n –来回跑的趟数 (52 次)

L = running distance, km (6.45 km)
T = total working time of a dump truck, hours (24 hours)
N = number of runs (52runs)

这台自卸车的平均工作速度，km/h，
V= 6.45×52/24=13.975；
TKPH 名义值 = 19.9×13.975=278
则考虑到环境温度的变化，还必须进行修正后 TKPH 值，修正公式如下：
TKPH＝TKPHnom /[1+(Ta-Tnom) ×0.0096]
如该规格的轮胎额定的 TKPH 值为 350，则上述的计算实际使用所需的 TKPH 值为 278，那么该轮胎适应于上述作业条件，可安全使用。

Average working speed of a dump truck, km/h
V= 6.45×52/24=13.975
TKPHnom = 19.9×13.975=278
Considering the ambient temperature, we should revise TKPH as below formula if necessary.
TKPH＝TKPHnom /[1+(Ta-Tnom) ×0.0096]
If the rated TKPH of 27.00R49 (E-4) is 350, it is suitable for operating in above working condition because the tyre's TKPH (= 350) is greater than the real site TKPH (=278).

10 道路维护 Road Maintenance

路面的维护是确定轮胎使用寿命的最重要的因素之一。颠簸，坑洼，岩石等都会切割和磨损轮胎，甚至引起爆炸。特别是在装载区和倾卸区，因为在这些地方，损坏的几率比较大。路面条件对车辆的保养有很大的影响。清除运输道路的障碍物是每位矿山工作人员的责任，而不仅是路面维护人员的职责。

Road maintenance is one of the most important factors to determine the tyre lifetime, bumps, check holes, rocks and so on will cut or wear the tyre, even will cause tyre bursting. It's particularly important to maintain road in loading and dumping area because the damage in these area is more. Not only the maintenance staff but also each staff at site has the responsibility to clean the obstacles on the road.

序号No.	路况Road condition	轮胎损坏类型Damage type for the tyres
1	载物散落在路面。 Dropped loaded material on roads.	轮胎割破处，会对胎体产生割伤，刺伤，裂纹。 Cuts, punctures, fissures of the carcass in the cut place.
2	道路坡度太陡，道路不平，凹凸面积过大。 Road improperly graded, with large bumps.	面不均匀磨损，由于道路状况不平稳，轮胎与路面凹凸处撞击导致胎体裂纹。 Non-uniform wear of the tread, fissure of the carcass due to high dynamic loads resulting from wear, heat damage of tyres.
3	路宽度和转弯半径不符合要求，道路斜坡过长，坡度过大。 Width and turning radius lower than standard, too long road grade, and grade larger than standard.	胎易被割伤，不均匀磨损，生热损坏。 Cuts, non-uniform wear, heat damage of tyres.

矿场的道路应符合工程建设的标准和相关规定（路面宽度、坡度、转弯半径等）。现场的道路，通向挖掘点的通道应定期进行维护，以避免对轮胎的机械损伤。

Road conditions should be comply with Standards and Regulations of project construction (width, grade, turning radius, etc.). Regular road maintenance is required to avoid mechanical damage to tyres.

道路基础进行技术维护：

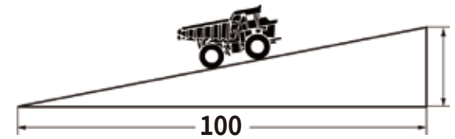
1.定期清理长期和短期运输道路、物料装卸点的石块；
2.确保道路上没有尖利的石块凸起物；
3.适时地修补道路损坏部位，压实松软的道路表面，湿路必须采用下水排沟的方式排水，确保道路表面干燥；
4.道路敷设的砾石的粒度大小不超过 40mm；
5.在冬季要清除路面上的冰雪。可以在每平方米使用 30-40 克的氯化钙和氯化钠混合物。

Maintenance for road:

1.Regularly clean off rocks on permanent/ temporary transportation road and loading & unloading sites;
2.Ensure that there are no sharp rocks on roads;
3.Rehabilitate the damaged road in due time, compact the soft road surface and dry down the flooded sections by means of drainage ducts;
4.The size of gravel particles covered on the roads must not exceed 40MM;
5.Remove snow and ice off road in winter. Can use a mix of calcium chloride and sodium chloride at a consumption rate of 30 - 40 g/sq.

道路坡度：

1. 道路坡度 [%]= 垂直距离 / 水平运距 ×100%；
2. 最高坡度不可超过 10%；
3. 当坡度增加时，轮胎更易打滑。这就增加轮胎的磨耗和耗油量。因此最佳的道路坡度应该不高于 5-6%。



Road Grade:

1.Road Grade [%] =Vertical distance / Horizontal distance×100%;
2.The grade should not exceed 10%;
3.When the grade increases, the tyre is more likely to slip. This increases tyre wear and reduces fuel efficiency. The ideal road grade is no more than 5-6%.

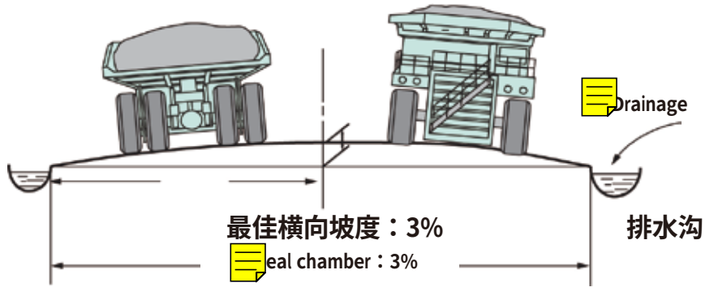
道路横向坡度：

最佳横向坡度：3%

若主干道的横向坡度过高，会使得车辆倾斜度增加、卡车中心偏移左右侧、以致车斗上的物料分布不均；坡度过小，则道路上的雨水等无法流进排水沟，导致路面泥泞。因此，海安公司建议的道路的最佳横向坡度应该在 3% 左右。

Road Chamber and Lane Width:

Higher chamber tend to incline of vehicle and shift of the center of gravity, it may also leads to uneven weight distribution. Too lower chamber results to difficulty in draining water. Haian company recommends that the ideal chamber is 3%.



轮胎滚动半径：

工程车轮胎滚动半径可通过以下公式来计算：

Rolling Radius:

The rolling radius of OTR tyre can be measured by below formula:

RR=ODx0.331+SLRx0.316+12.2

R: 滚动半径 (mm) Rolling Radius (mm)
OD: 外直径 (mm) Overall Diameter (mm)
SLR: 静止负荷半径 (mm) Static Loaded Radius (mm)

卡车的行驶速度对轮胎滚动半径也有较大的影响，请参考以下推荐的最小半径和最大运速表：

Truck speed will affect the tyre rolling radius, please follow the recommended radius and speed limit listed below:

ecommend Radius&Speed Limit	
最小半径（m） Min Radius（m）	最大运速（km/h） Max Speed(km/h)
15	8
25	10
50	15
75	20
100	25
200	30

了防止轮胎的持续压力，当车辆转弯时，请注意下表所示的转向半径和边坡建议。

To prevent excessive tyre stress when a vehicle turns a corner, please follow the radius and bank recommendations listed below:

推荐的边坡 Recommended Bank

转向半径 dius		速度 千米/小时（英里/小时） Speed km/h(mph)																	
Meter	英尺 t	16 (10)	24 (15)	32 (20)	40 (25)	48 (30)	56 (35)	64 (40)	72 (45)										
23	75	8.50%	20%			20%													
30	100	6.50%	15%			17%													
46	150	4%	10%	17.50%		15%	20%												
61	200	3%	7.50%	13.50%	21%	13%	18%												
76	250	2.50%	6%	10.50%	16.50%	12%	16%	21%											
91	300	2%	5%	9%	13.50%	10%	13.50%	17.50%	22%										
107	350	1.50%	4%	7.50%	12%	8.50%	11.50%	15%	19%										
122	400		4%	6.50%	10%	7.50%	10%	13%	16.50%										
137	450		3.50%	6%	9%	6.50%	9%	12%	15%										
152	500		3%	5%	8%	6%	8%	10.50%	13.50%										
183	600		2.50%	4.50%	7%	5%	7%	9%	11%										
213	700		2%	3.50%	6%	4%	6%	7.50%	9.50%										
244	800		2%	3%	5%	3.50%	5%	6.50%	8.50%										
274	900		1.50%	3%	4.50%		4%	5.50%	7.50%										
305	1000			2.50%	4%		3.50%	4.50%	6.50%										
366	1200			2%	3.50%		3%	4%	5.50%										
427	1400			2%	3%			3.50%	4.50%										
488	1600			1.50%	2.50%			3%	4%										

11 卡车驾驶
Truck Driving

司机驾驶期间需注意事项：

1. 避免突然起动和停止；
2. 不要在路肩上行驶；
3. 减少转弯速度；
4. 不要空转轮胎；
5. 保持适当的充气内压；
6. 及时清理轮胎表面的异物；
7. 定期检查轮胎，轮辋和阀门有无异常；
8. 立即修复或更换任何损坏的轮胎。

Precautions during Driving:

1.Avoid abrupt starts and stops;
2.Do not drive on road shoulders;
3.Reduce speed on turns;
4.Do not spin tyres;
5.Maintain proper inflation pressure;
6.Remove any objects, such as rocks which get stuck in the tread or between dual tyres;
7.Check tyres, rims and valves regularly for any abnormalities;
8.Repair/change any damaged tires immediately.

装载工作时：

◎注意装卸区的石块和其他杂物；
◎避免装载物掉落在轮胎周围；
◎避免超载；
◎将物料装载在车斗中间。

During Loading:

◎Keep loading areas clear of rocks and other obstacles;
◎Avoid spilling load around the tyres;
◎Avoid over-loading;
◎Load to the center of the dump truck's decks.

卡车的正确维护：

为了安全和经济节约的角度考虑，卡车的正确保养非常必要。当然这就要求卡车维护人员经常的仔细检查。

注意：

(1) 不可使用未经保养和维修检测的卡车。使用未经保养修护的卡车是引起事故或损失的主要原因；
(2) 下表列出了因为卡车失修可能引发的对轮胎的损伤的可能；
(3) 卡车车轮定位失调会引发轮胎的异常磨损和轮胎的摆动，请严格按照卡车维护手册所述的维护要求。

Vehicle Maintenance:

From the standpoint of safety and economy, proper maintenance of the vehicle is absolutely necessary. This, of course, requires constant, careful work by the maintenance person.

WARNING:

(1) Avoid using any vehicles not inspected for maintenance and repair. Use vehicles in a poor state of repair is a major cause of damage and/or accidents;
(2) Some possible damages to tyres resulting from vehicles in disrepair are listed in below table;
(3) Vehicle misalignment can cause both irregular wear and tyre vibration. Please strictly follow the maintenance recommendations outlined in each vehicle's maintenance manual.

因卡车维护不佳引起的轮胎损伤：

The Damage Caused by Poor Maintenance of Vehicles:

问题Problem	轮胎损伤Tyre Damage
定位失调 Misalignment	磨损，缩短轮胎使用寿命乃至胎面剥离 ular wear, Shorten tire life, Tread separation
的悬挂系统 Broken suspensions	磨损，迅速的磨损和割裂 gular wear, Quick wearing and cutting
油泄漏 Fuel and oil leakage	面鼓起或胶料老化，缩短轮胎寿命 elling and aging of rubber which shortens tire life

12 轮胎主要问题与原因
Common Damages & Solutions

序号	损坏类型	损坏原因	建议措施
1	刺扎，但是没有伤到胎体	不合适的路面状况和不当的轮胎装卸场地，其他原因：1、行驶速度过高；2、轮胎内压过高或者过低；3、超载。	清除轮胎装卸场地和行驶道路上的杂物；拓宽行驶大路，降低轮胎驾驶速度，检查内压，避免超载，可以继续使用轮胎。
2	刺扎，切割到胎体，但是胎体没有损坏	尖锐物刺伤	将轮胎拆卸下来进行修补，或者可以继续使用轮胎。
3	胎体帘布层已经损坏	尖锐物刺伤	将轮胎拆卸下来，并且：1、如果破损的面积和类型是可以修补的，则修补轮胎；2、如果破损的面部和类型是无法修补的，轮胎不可再使用。
4	胎面出现缺口、裂缝和崩花，或者胎面出现裂沟	与路面尖锐物发生碰撞	道路维护
5	大裂缝，已经深入到胎体帘布层	尖锐物刺伤	不得继续使用轮胎
6	在胎面与胎侧出现裂纹：1、程度比较轻，浅纹；2、数量多，已经到达胎体	轮胎气压不正确； 超载，或者是轮胎存储不当。	程度轻微的轮胎，检查轮胎内压正确，不得有超载后可使用。程度严重的轮胎不得再继续使用。
7	胎面磨损：1、胎面磨损均一，在到达最大允许使用价值之前老化。	1.1、由于路面状况不好导致对轮胎的割损和摩擦，在与路面的接触处产生鼓包。在车辆停放处和维修点存有油污与轮胎橡胶相接触而鼓包。 1.2、超载 1.3、高速行驶	清洗停车点和维修点的油污。避免超载，降低行驶速度。一旦轮胎到达了磨耗极限值，；轮胎不能再继续使用。
	2、胎面一边磨损。	车辆缺陷导致了轮辋排列不整齐，不当的重量分配。	检查车辆的技术状况。适时的更换轮胎的位置。
	3、胎面锯齿状磨损	轮胎轮辋配列不整齐，刹车失效	检查车辆的技术状况，如果轮胎达到了磨损极限值，轮胎不得再使用。
	4、其他印迹	刹车、刹车锁装置	消除不符合规范的操作，避免打滑。如果印迹的深度已经超过轮胎的磨损极限，则轮胎不得再继续使用。
	5、轮胎与地面接触的胎面中间过渡磨损	轮胎内压过大	轮胎内压不得超过允许值
	6、磨损超过了最大允许值	没有进行轮胎常规检查	如果轮胎的磨损已经超过了轮胎的磨损极限，轮胎不得再继续使用。每天用肉眼进行轮胎常规检查，轮胎不得再继续使用。
8	胎面点状脱层、打折（包括子午胎）	轮辋凹槽内的水分浸入子口	轮胎不得继续使用
9	胎肩、与路面基础的轮胎胎冠脱层，胎体脱层	裂口、刺口增大；其他原因：9.1、行驶速度过高；9.2、过载；9.3、内压不符合标准	修补原来的裂口和刺口。注意道路维护，使道路的状况与采矿业的要求和标准一致。轮胎不得再继续使用。
10	胎体层出现裂纹（对角线方向、斜交叉方向、V 型裂纹）	驾驶通过障碍物；轮胎内压升高；超载	不得再继续使用轮胎。
11	胎体层的裂缝	轮胎内压降低或者内胎无压力	不得再继续使用轮胎。
12	胎里泡	轮胎内部生热过多	不得再继续使用轮胎。
13	轮胎子口损坏	安装不当，不平整，毛头、轮辋腐蚀，轮辋变形；超载	坚持轮胎装卸规程，不要使用不当的轮辋，不要过载。如果轮胎气密功能消失后，不再使用。

No.	Type of damage	Cause of damage	Suggestion
1	Cuts, but not penetrating to the carcass	condition of roads and loading & loading yards.Additional factors: 1.High running speed; 2.Deviation from standard internal pressure;3.Overloading	ear roads and loading & unloading yards. Widen carriage ways. Reduce running speed. Check internal pressure. Eliminate overloading.
2	, penetrating to the carcass. ass plies not damaged.	etration by sharp objects	mount the tyre and repair it.
3	eep cuts damaged carcass plies.	pact with sharp objects on road surface.	mount the tyre and:1. Repair the tyre, if the size type of damage is within acceptable limits.2. Remove the tyre, if the size and type of damage is outside acceptable limits.
4	and cracks on the tread. Fissure ad pattern.	etration by sharp objects	r roads and loading & unloading yards.
5	ge gaps, penetrating to the carcass plies.	etration by sharp objects	her use of the tyre is not allowed.
6	s on the tread and sidewalls:1. Slight, superficial.2. Numerous, deep, penetrating to the carcass.	proper inflation pressure. Overloading or improper storage.	s with slight cracks are allowed to continue using r checking inflation pressure and eliminating overloading. Tyres with numerous and deep cracks are not allowed to continue using.
7	Tread wear: 1. Uniform, premature up to the maximum permissible value	Bulging of the contact surface due ut, chamfers when road condition is unsatisfactory. Bulging of rubber when it is oiled with petroleum products present in parking and repair sites. 1.2 Overloading 1.3 High running speed	Clean petroleum smear of parking and repair sites. Eliminate overloading, reduce running speed. The tyre is to be removed once it reaches the permissible wear limit.
	2. One-sided	ective vehicle resulting from toe-in/toe-out misalignment of wheels and improper load distribution.	ck the technical condition of the dump truck. Change positions of tyres in due time.
	awtooth-shaped	orrect toe-in/toe-out alignment of wheels. Faulty brakes.	ck the technical condition of a dump truck.The re is to be removed once it reaches the permissible wear limit.
	. Other cracks	Skid braking, locking of brakes.	inate irregular operation. Avoid skidding.The tyre is to be removed once it reaches the permissible wear limit in one or more cracks.
	creased in the middle of the tread ontact surface	r-inflation pressure.	ot exceed the permissible inflation pressure.
	5. Wear exceeding the maximum permissible value	No regular inspections of tyres.	tyre should be removed upon reaching the missible wear limit in the centerline of the tread. Perform daily visual inspections of tyres.Further use of the tyre is not allowed.
8	delamination of tread, bulging in the case of radial tyres with metal cord)	er penetration in the damaged area under grooves.	her use of the tyre is not allowed.
9	Delamination of sidewalls, tread in the contact surface.Delamination of the carcass.	cut and puncture bigger. Additional tors:1. High running speed.2. Overloading3. Deviation from standard inflation pressure.	air original cuts and punctures in tread and sidewall of a tyre. To keep the road in good condition. Further use of the tyre is forbidden.
10	cks of carcass plies (diagonal, rosswise an V-shaped)	ing over obstacles.Driving with reased pressure in tyres.Overloading.	er use of the tyre is not allowed.
11	ure of the carcass	ing with reduced internal or on a e without air.	er use of the tyre is not allowed.
12	ers in the c s	Excessive heat build-up in the tyre	her use of the tyre is not allowed
13	Damage to the tyre bead	roper mounting, dismounting rations.Unevenness, burrs and corrosion on rims.Deformed parts of the rims.Overloading.	pect principles for mounting, dismounting eration.Eliminate the use of defective rims.Avoid overloading.Stop using the tyre if it lose air-tight function.

13 轮胎的停用
Tyre Removal

停用判定参考标准：

◎轮胎胎面、胎侧或者胎肩刺破、割伤的；
◎轮胎出现鼓包、割伤剥离、热剥离、气密层有裂缝影响安全运行的；
◎轮胎经过明火燃烧的；
◎轮胎安装法兰的趾口部位磨损露出钢丝后；
◎对于修补胎：单条轮胎补片数超过 2 个的必须报废；胎侧补片突出平面高度 50mm，经再次修补无效的。

The Standard of Tyre Removal(for reference only):

◎More than five steel wires break on the sidewall or shoulder;
◎When the tyre has bulge, cut separation, heat separation or inner liner split;
◎When tyre burns;
◎When the bead area fitted with flange has appeared wires;
◎For the repaired tyre:Tyre has been repaired with more than two patches should be disposed. If the the patch is higher than 50mm from the sidewall surface, then it should be removed.

停用处理：

◎轮胎的胎面磨损后，如果检查胎体没有问题，就把这条轮胎送交轮胎维修工厂，同时连同附件四一起交给工厂；
◎要与轮胎修补工厂的代表一起来到车库选择适于修补的轮胎；
◎根据车辆驾驶人员建议，通过目测检查轮胎是否要停用。轮胎被判为停用，轮胎使用卡必须进行归档保存；
◎海安橡胶公司做出损坏的期限是 2 年，计算日期从制造日开始算起。有关轮胎质量问题的轮胎索赔请求可按协议以一定的程序进行操作。

Tyre Removal:

◎After tyre tread pattern has been worn but non-defective on carcass, take the tyre to a tyre repair station with a Tyre Record;
◎Come to garage with representatives from tyres repairing factory to select tyres which can be repaired;
◎According to the vehicle drivers ’recommendation, through visual inspection to check whether the tyres should be decommissioned. If tyres are determined decommission, tyre usage card should be archived;
◎Expiration time of storage is 2 years from the manufacturing date. If you have any quality claims, please follow the procedures of contract.

索赔：

◎当由于制造方面的原因造成的向轮胎制造商索赔时，必须将索赔的轮胎，提供给海安公司进口商或授权经销商。同时将出现质量问题的‘ 陆安 ’牌巨型工程轮胎的生产序号、累计行驶小时或公里数、装车时间、损坏时间及损坏情况做好详细记录，并将现场、损坏轮胎的部位、整条带‘ 陆安 ’商标轮胎的照片和上述详细记录提供给福建省海安橡胶有限公司，以助于原因的正确判断；
◎应将损坏的、不能再使用的轮胎进行妥善保管。必要时，福建省海安橡胶有限公司将派工程师赴现场查看并分析研究。

Claims:

◎While claims occured because of manufacturing defects, the original tyre purchaser must present the claimed tyre to the importer of Haian company or an authorized sealer of Haian company. In the meantime, the original purchaser should record the history running report of tyre(serial number, running hours and distance, time of mounting and worn-out, description of damage etc.) and provide the pictures that show the site where the damage occurs and the whole images of the tyre with haian brand name and logo and the image showing the damaged part of the claimed tyre, so that the engineer of Haian company can make a correct judgment for the damage;

◎The original purchaser of the claimed tyre should properly keep the damaged, unserviceable tyre. If necessary, the manufacturer will send engineers for site inspection.

因以下情况而卸下报废的轮胎不在索赔范围之内：

1.由于一些不规则运动的物体、石头，和其它自然物体导致轮胎遭受机械割伤和破裂，损坏了轮胎的工作性能；
2.由于气压过高或者过低导致轮胎磨损不均匀而无法使用的轮胎；
3.由于化学品（油、油脂、汽油等）导致轮胎无法使用；
4.超载运行；
5.超速运行；
6.矿车商要求技术参数选择轮胎型号或负载标准不当的。

Exclusion clause for claim:

◎Mechanic damage, cuts and breaks to affect working performance of tyres are result from some objects in irregular movement, stones and other natural object;

◎Non-uniform wear and failures caused by over-inflation or under-inflation of a tyre;

◎Failures caused by chemicals, such as oils, greases, petrol, etc;

◎Over loading;

◎Over speed;

◎Improper selection of tyre size and loading index by dump truck manufacturers.

轮胎的存放 Tyre Storage 14

为了防止轮胎过早老化，轮胎必须存放在干燥和阴凉的房间，以防止日晒或潮湿。轮胎必须倾斜存放，靠在坚固的墙壁上或者制成物上。轮胎与地面水平线的倾斜角度控制在 60-70 度。并在轮胎的两侧垫置木棍以防轮胎移动。

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To prevent tyres from aging, tyres should be stored in a dry and cool room to be protected from sunlight and humidity.Tyres should be stored slant, rested against a strong wall or support. An angle of inclination between a tyre and horizontal surface should be within 60-70degrees. Wooden blocks or wooden bars should be placed on the ground against the tyre 's both sides to avoid movement.

1.存放轮胎时不应与汽油产品、酸、碱和其它降解橡胶的物质等存放在一起，远离发热源；
2.露天存放轮胎，须使用防水布或者其它可以阻挡太阳光和阻挡潮湿的材质覆盖在轮胎上；
3.在轮胎安装到车辆以前，严禁移除轮胎的定位部件和保护胎圈子口的覆盖物；
4.如果轮胎需要长期存放，则两个月内要翻转轮胎一次，变换轮胎存放的受力点；
5.轮胎不宜水平存放以免变形。但安装在轮辋上的轮胎必须水平存放；
6.已安装轮辋的轮胎，其充气压力水平需符合轮胎的不同规格，花纹深度，及其所在不同矿区的地理，气候和矿区日常规定的不同标准。但气压最低不得少于 80kpa，最高（40.00R57 以上规格）不得超过 110kpa；
7.存放轮胎的库房应保持通风良好，室温以－10℃～ 30℃，相对湿度在 50%～ 80%为宜，并远离发电设备及其他产生臭氧的地方。

1.Tyres must not be stored together with petroleum products, acids, alkalis and other substances which can cause rubber degradation. Keep away from heat source;
2.Outdoor storage ...covered with waterproof tarpaulin;
3.Do not remove the positioning elements and bead protector until you 're ready to mount the tyre;
4.Tyres should be overturned once in two months to change supporting points;
5.To avoid tyre deformation, it should not be placed horizontally. But tyres mounted on wheel rims should be stored horizontally;
6. Tyre pressure should be inflated according to the different sizes of tyres with different tread pattern depth, as well as the conditions of geography and weather on different mine sites, and the standard specified by different mine companies. The lowest pressure is 80kpa. The highest pressure above 40.00R57 can 't be exceed 110kpa;
7. Storeroom should be well-ventilated, with the temperature between -10 ° C to 30 ° C, relative humidity of 50% ~ 80%, away from power equipments and other sites that may release ozonide.

轮胎的存放必须按照以下类别分开存放：

1. 未安装过的新胎；
2. 修补过的轮胎；
3. 待修补的轮胎；
4. 报废不能用的轮胎；
5. 使用过的卸下来的旧胎，但是仍可再用。

Tyres should be clearly classified and stored as following:

1.New tyres;
2.Repaired tyres;
3.Tyres to be repaired;
4.Scrapped tyres;
5.Demounted tyre can be further used.

必须遵循以下步骤卸下仍可再用的轮胎：

1. 清除轮胎上的石头、污泥和异物；
2. 修理受损部位（如果受损部位必须修理）；
3. 要在轮胎上贴上标签，标明它的行驶里程，花纹所剩深度，卸胎车辆序号，装车位置、日期。

Procedures of demounting old tyre which is still usable:

1.Remove stones and other objects from tyre tread;
2.Repair damage areas, if necessary;
3.Attach a label on the tyre that indicates mileage, RTD, fitted truck no. the wheel position and the fitting date.

注意：轮胎存放处必须配备基本的灭火设备。

Note: Tyre storage site should be provided with anti-fire devices.

轮胎的日常检查 15
Tyre Daily Inspection

即使轮胎和道路保养得当，若使用不当仍会严重缩短轮胎的使用寿命。为了检查轮胎磨耗情况，并避免因没能及时修补轮胎导致的轮胎报废，建议矿山方面定期检查在车轮胎。

As we all know, incorrect usage will strongly shorten the tyre life. In order to avoid unnecessary scrap, we suggest that mine site should inspect the running tyre periodically.

检查需要特别注意：

1. 安全套装佩戴齐全，包括安全衣，安全帽，安全靴，手套，护目镜(以防测压时气体喷出伤到眼睛)；
2. 最好在卡车空载状态下对轮胎进行停车检查。若不得不载重状态下检查，请保持与卡车的安全距离，且需特别注意卡车上可能的落石。卡车在排队期间最好不要检查轮胎，因为此时卡车司机在排队时，看到前方卡车开动走后，容易忘记有人正在检查轮胎而往前开动；
3. 检查前，通知司机停掉发动机，并在卡车前方挂上安全指示牌或安全锁。若是测压，建议最好有两个人参与，一个人为检查员，负责实际检测项目；另一个协助员，负责勘察卡车和司机的沟通工作。

Precautions during inspection:

1. Safety wear must be dressed, which include protecting suit, hard cap, safety shoes, gloves and the protect glasses;
2. It's better to inspect the tyre not loaded, if you have to inspect tyre in loaded truck, please keep a safety distance with the truck and keep special attention to the rolling stone from the truck. Better not inspect the truck in queue;
3. Truck driver should turn off the engine during the inspection, then hang up a safety warning tag in front of the truck. At least two persons are required to do the pressure test, so that one person can measure the pressure, the other one can coordinate the communication between truck and driver.

检查在车轮胎时所需的工具：

需配备的工具有手电筒、卷尺、深度游标卡尺、气压表、肥皂水(用于检测轮胎是否有漏气)

Tools needed for tyre inspection:

Flashlight, measure tape, depth gauge, barometer and soap water (to test the air leakage).

检查要点：

为了防止轮胎问题，必须定期对轮胎，轮辋，气门，充气内压等进行常规检查 . 以下是进行检查的步骤和建议 .

Inspection Points:

To avoid tyre mulfunction, it is required to inspect tyre, rim, valve, pressure frequently. See the below process of inspection.

轮胎胎面：

不同的花纹、测量花纹深度的位置也不同，需要按照轮胎制造商指定的测试点进行测试；轮胎胎面的花纹深度必须使用深度测量设备，使用前需要经过校准。

◎清除胎面异物。修复到胎体的任何损伤；
◎若出现胎面分离，则应移动和检查轮胎进行必要的修理；
◎若已损坏至胎体，轮胎必须进行修理；
◎胎面花纹沟裂口可能是因为漏气，检查充气内压；
◎不均匀磨损可能是充气内压不准确，必要时需更换轮胎；
◎应避免与车辆接触的损伤 . 有必要时应更换零部件；
◎胎面的油污应清理干净。

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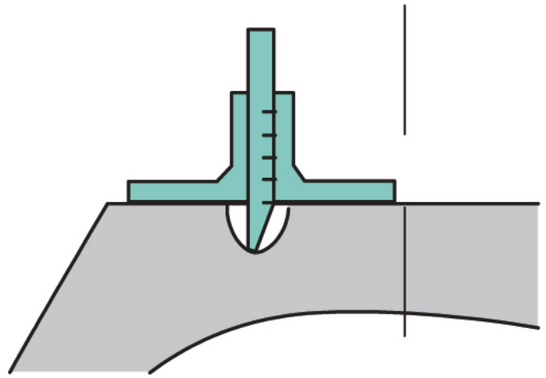
Tyre Tread:

Different pattern has the different measuring position, you're required to measure tread depth by the standard which is designated by tyre manufacturer. The tools must be calibrated before measurement.

◎Remove any foreign matter from the tread;
◎If tread separation exists, remove tyre and repair;
◎If cuts or chips reach carcass, the tyre must be repaired;
◎Cracks in tread groove may be caused by leakage, check inflation pressure;
◎Uneven wear may be caused by improper inflation pressure, change tyre if necessary;
◎Contact damage with vehicle should be avoided, change components if necessary;
◎Wash off the oil or grease on tread.



胎肩和胎侧：

◎修补到达胎体的任何损伤；
◎确认裂口的各种原因。如低压，超载，臭氧或切割造成的损伤等，必要时进行修理；
◎清洗多余油脂。

Shoulder and sidewall:

◎Repair any cuts reaching the carcass;
◎Identify cause of cracks e.g. under-inflation, overloading, ozone, cut, etc, and repair it if necessary;
◎Wash off oil or grease spots.

阀门：

◎若出现由于气门芯损坏，气门收缩或胀大而引起的漏气，则必须更换阀门或其零部件；
◎确保气门嘴完好。

Valve:

◎Replace valve or valve parts if leakage exists from valve core, deflection of stem or extension;
◎Ensure valve cap is in good condition.

双胎：

◎清理两胎之间的杂物。(注意，并胎之间的任何异物对运行中的轮胎都有非常大的危险，若有异物卡在轮胎中间而无法直接清除，则需要把这两条轮胎完全排气之后卸下清理异物。)
◎若排石杠弯折或偏离位置，则需要维修。

Dual Tyres:

◎Make sure to remove any foreign object stuck between duals;
◎Repair stone ejector if bent or out of position.

充气内压：

◎轮胎最好是在冷态情况下进行测压；
◎测压前，需要把充气阀门表面清理干净；
◎若所测出的气压值比我司提供的指定气压值超过 10% 的范围，那么就必须马上调整内压至适当的压力；
◎若存在漏气，则检测泄气的位置并修理。

Inflation Pressure:

◎Check the tyre pressure when it is in cold condition;
◎Clean the valve before measure the pressure;
◎Adjust if the pressure rating difference 10% more than Haian recommended;
◎Detect location and repair if leakage exists.

★ **注意：**必须佩戴护目镜测压；绝不可对热态轮胎进行排气！

Note: You should wear the eye protector during the inspection.Never leak the air of hot tyre.

轮辋：◎变形或裂口，应立即更换 .

n:◎Replace the rim if deformation or cracks exist.

轮胎的停用：

◎轮胎卸载后主要处理结果如下：运回仓库备用；维修；翻新；报废处理。因此，细致认真地对轮胎的检查有助于确认该条轮胎是否需要维修还是进一步翻新，而不是仅仅做报废处理，这也是基于节约成本的考虑；
◎轮胎搬运期间需特别注意周边的安全问题。对于这种巨型轮胎，需要把轮胎水平放置在地面，再进行检查；
◎若需要了解胎体使用情况和轮胎翻新还是修补问题时，需要将轮胎内部进行认真检查。

Tyre Removal:

◎The results of tyre removal: ship back to the warehouse, repair, retread or scrap. When the tyre was removed, we should carefully inspect the tyre damage area and decide whether tyre can be repaired or retreaded, this will help save cost;
◎Please take note of surrounding safety when tyre remove, you're required to puttyre on ground horizontally then start to inspect;
◎You need to inspect the internal part of tyre carefully if want to check the tyre usage and decide whether retread or repair.

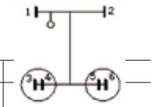
轮胎使用记录：

◎完整详实的轮胎使用记录并定期反馈给海安公司是非常重要的；
◎新胎和修补轮胎的每月行驶里程数必须定期记录，每条轮胎分开记录。新胎还必须记录序列号，修补轮胎的号码根据轮胎修补厂给的号码进行记录。当收到新胎（包括新车的轮胎、修补过的轮胎、或者旧胎），都必须为每条轮胎建立一个轮胎使用卡（参见下页）；
◎使用卡记录了轮胎使用和维修的基本信息，而且是判定轮胎行驶里程、索赔备案、轮胎废弃判定的原始记录。该表中所有要求的空格内容都要填写；
◎如果轮胎的位置进行了更换或者停用，那么轮胎使用卡必须记录这条轮胎的更换的时间、被换轮胎的胎号和位置或者是停用轮胎的胎号和位置、实际的行驶里程、位置更换的原因或者是停用的原因，以及最后的胎面花纹深度（平均值）。

Tyre Usage Records.:

◎The detailed tyre records are needed, and it's very important to send them back to Haian periodically;
◎The running distance of new & repaired tyre should be recorded monthly and separately, also the serial number is needed for each tyre (pls refer to the serial no. provided by repair station for the repaired tyre).You're required to make a tyre record card for each tyre;
◎This card records the basic info. of usage & repair, which is very helpful for our judgment, please fill it completely;
◎If the tyre position are changed or out of service, the record card must be noted with: the changed date, serial number, position, actual running distance, the reason of change or removal and the average RTD.

轮胎记录卡



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累计小时数： 小时

详细胎号： 首次装胎日期： 报废拆下日期： 记录人：

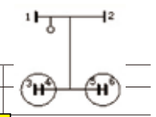
车号	装胎位置	安装		拆卸		累计计时	剩余花纹（mm）			拆下原因及处理方式
		年月日	卡车计时	年月日	卡车计时		左	中	右	

卸胎时间： 年 月 日 时 分 卸胎员：

备注：1.卡片上方“累计小时数”为报废后填写
2.每周日以电子档形式发回海安售后服务部一次
3.若有报废胎发现请在当天发回时数及照片

记录卡编号：

yre Record Card



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total running hours： H

al NO： Fitted Date： moval date： order：

V cle Mount nount ding Hours TD（mm） Re s& Description

D- cle Hours -Y Vehicle H s

moval Date: Supervisor：

Note .filling in the “ Total Running Hours ”
2.Please update the record weekly & send to the Haian
3.Please take photos on the Removal tyre and record the card

rd NO：

第三部分
轮胎的相关测试

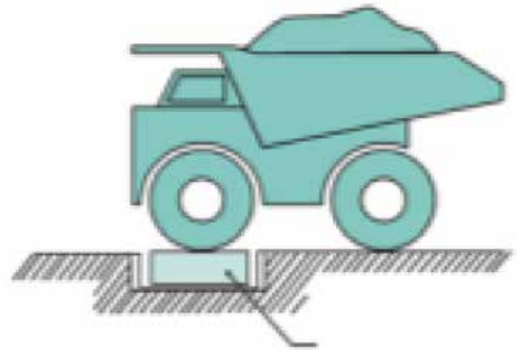
Part III
Tyre Studies



1 载重测试
Weight Study

在实际装载情况下，海安技术服务团队会对自卸车的车重及运行条件，来计算轮胎的负荷承受力。

Haian engineer will measure the dump truck weight under actual loading and transporting conditions to calculate tyre load capacity.



步骤：

1. 检查轮胎使用的环境 - - 搬运的材料，车辆容积（车斗或铲斗容积）装料频率，装料条件（平装、多装、偏装）道路状况等等；
2. 准备测试的工具 - - 测重磅，数据表，相机等；
3. 安装测重磅 - - 选择一个平坦、笔直坚硬的路面（如上图所示）；
4. 检查要称重的车辆 - - 检查轮胎规格、样式，花纹深度及气压；
5. 重量调查 - - 分别对空载卡车及载重卡车进行测重。测量一个或者两个轮胎的负荷、所有轮胎的负荷并计算车轴重量和整车重量；
6. 分析数据是否在合理范围之内。

Steps:

1. Check Truck conditions - - Material handled, vehicle capacity(bucket capacity), loading frequency, load conditions (flat pile, large pile, off - center pile), road conditions, etc;
2. Prepare instruments - - Weight scale, data sheet, camera, etc;
3. Install scales. - - Choose a flat, level and hard surface. Generally, scales are installed in the ground as shown above;
4. Inspect vehicle to be weighed—Check tyre size, pattern, tread depth and air pressure;
5. Weight study—Weigh empty and loaded vehicle. Measure load on all tyres and calculate axle and vehicle weight;
6. Analyze data.

警告：测试时请注意车斗上的滚石！

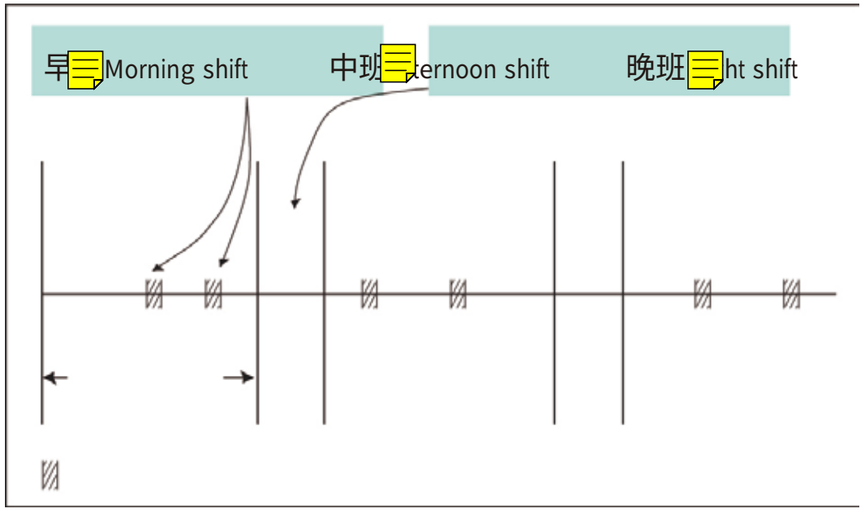
Warning: Attention the rolling rocks from the loaded truck.

TKPH值测试
TKPH Study

2

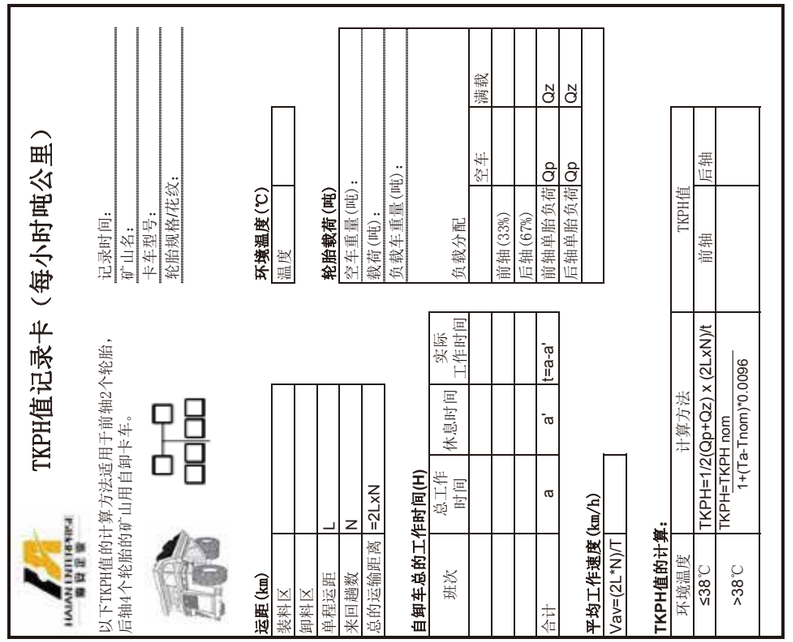
海安技术团队制定了规范的 TKPH 值测试流程。测试 TKPH 值所需的信息有：

Information Required：



A：往返运距（km 公里）
B：轮班
◎作业时间 / 轮班时间（小时）
◎每天班次数（班）
◎一次轮班中的休息时间（小时）
◎两次轮班之间休息的时间（小时）
C：往返时间
◎装载时间　◎拖运时间
◎卸载时间　◎返回时间
◎等待时间　◎一圈总耗时
D：单胎载荷
◎重量分布（重车状态和空车状态）
◎前轮单胎载重（重车状态和空车状态）
◎后轮单胎载重（重车状态和空车状态）
E：计算轮胎平均载重量
F：计算轮胎平均工作速度

A: Distance (Round Trip) Kilometers
B: Shifts
◎Working Time / Shift hour (Hours)
◎No. of Shift per Day
◎Break Time within a Shift (Hours)
◎Break Time between Shifts (Hours)
C: Cycle Time
◎Loading Time　◎Hauling Time
◎Dumping Time　◎Returning Time
◎Waiting Time　◎Total Time Per Cycle
D: Load Per Tyre
◎Weight Distribution (Loaded and Empty)
◎Weight on Each Front Tyre in Metric Tons (Loaded and Empty)
◎Weight on Each Rear Tyrein Metric Tons (Loaded and Empty)
E: Calculate Average Tyre Load
F: Calculate Average Tyre Working - Speed



TKPH值记录卡（每小时吨公里）

以下TKPH值的计算方法适用于前轴2个轮胎，后轴4个轮胎的矿山用自卸卡车。

记录时间：
矿山名：
卡车型号：
轮胎规格/花纹：

环境温度(℃)

温度	

轮胎载荷(吨)

空车重量(吨)：	
载荷(吨)：	
负载车重量(吨)：	

负载分配		空车	满载	
前轴(33%)				
后轴(67%)				Qz
前轴单胎负荷		Qp		Qz
后轴单胎负荷		Qp		Qz

运距(km)

装料区	
卸料区	
单程运距	L
来回趟数	N
总的运输距离	=2LxN

自卸车总的工作时间(H)

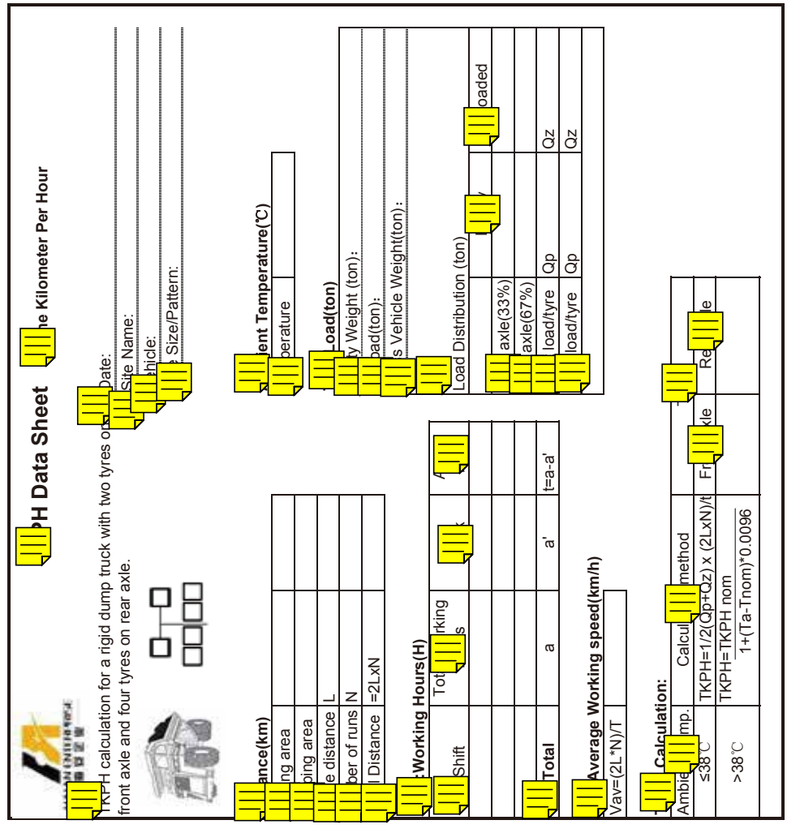
班次	总工作时间	休息时间	实际工作时间
合计	a	a'	t=a-a'

平均工作速度(km/h)

Vav=(2L*N)/T

TKPH值的计算：

环境温度	计算方法	TKPH值		
		前轴	后轴	
≤38℃	TKPH=1/2(Qp+Qz) x (2LxN)/t			
>38℃	TKPH=TKPH nom 1+(Ta-Tnom)*0.0096			



TKPH Data Sheet

Tonne Kilometer Per Hour

TKPH calculation for a rigid dump truck with two tyres on front axle and four tyres on rear axle.

Date:
Site Name:
Vehicle:
Tyre Size/Pattern:

Environment Temperature(℃)

Temperature	

Payload(ton)

Empty Weight (ton):	
Payload(ton):	
Gross Vehicle Weight(ton):	

Load Distribution (ton)		Loaded	
axle(33%)			
axle(67%)			Qz
load/tyre	Qp		Qz
load/tyre	Qp		Qz

Distance(km)

Loading area	
Dumping area	
Single distance	L
Number of runs	N
Total Distance	=2LxN

Total Working Hours(H)

	Total Working Hours		
Shift			
Total	a	a'	t=a-a'

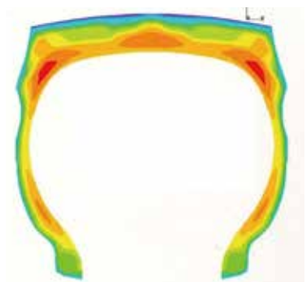
Average Working speed(km/h)

Vav=(2L*N)/T

Calculation:

Ambient Temp.	Calculation method	TKPH		
		Front axle	Rear axle	
≤38℃	TKPH=1/2(Qp+Qz) x (2LxN)/t			
>38℃	TKPH=TKPH nom 1+(Ta-Tnom)*0.0096			

热力测试 Heat Study 3



◎热力测试的主要目的是通过轮胎的热实验，研究轮胎的内部温度，正确地选择轮胎的花纹和胎面胶的配方，避免轮胎的热剥离；

◎在常规操作环境下，工程轮胎主要是因为使用过程中不断的挠曲而生热。生热的程度主要由轮胎曲挠幅度（即卡车载荷）及轮胎曲挠的频率（即卡车速度）。为了降低轮胎生热，平整的运输道路、拐弯幅度小、适当的运行速度及道路弯面加倾度等要素至关重要；

◎轮胎的生热情况取决于轮胎不同部位的厚度、扭曲度等因素。比如胎面花纹块和轮胎子口就比更薄的胎侧生热更快。相对于环境温度，工程胎胶料温度高；

◎子午线工程轮胎胶料焦烧的温度是 94°C。过高的轮胎温度易引起早期的轮胎报废，甚至在极端案例中，有其他品牌因温度过高而爆燃的情况。而且轮胎在高温状态下不耐切割；

◎正常的运行情况下，轮胎最热的部位是在花纹块中间胎面最厚的地方，这一部位最靠近第一层带束层。海安公司在测温时使用专业的测试工具，如热电偶测温针，具体流程如下：

1. 根据海安公司技术中心提供的胎面结构图及花纹深度，在划定的位置钻孔；
2. 将备好的热电偶测温针插入已打好的孔；
3. 读取测温仪上显示的温度并记录到表单中。详见下页《热力测试测温表》

◎更多信息请联系海安公司技术代表。

◎The purpose of the heat study is to verify the tyre internal temperature, then correctly choose the tyre tread pattern and tread compound to avoid heat separation;

◎Under normal operating condition, earthmover tyre will build up heat due to constant flexing during running, and the heat degree is decided by truck load and truck speed. In order to reduce the heat generation, it's essential to keep smooth haul road, gradual turning, proper running speed and suitablesuperelevation;

◎Different tyre section thickness and flexibility will affect the tyre heat generation, for example, the thick tread pattern and bead will generate more heat than thin sidewall. Comparing to the ambient temperature, the rubber used in the earthmover tyre will operate at a reasonably high temperature;

◎The rubber of OTR tyre will be burn at 94°C, high temperature is prone to early tyre failure, it may even lead to tyre fires in extreme cases. Hot tyres are also less resistant to rock cuts;

◎The hottest tyrepart during normal running is the middle of the tread blocks, close to the first belt ply where the rubber is the thickest. Haian company use its own heat study kit which utilizes K-Type thermocouple probes to measure temperature, the procedure is as below:

1. Drill pilot holes into the center of tread pattern according to the tread construction drawing and tread depth which provided by Haian;
2. Insert a thermocouple probe into the pilot hole;
3. Record the temperature.(fill the heat study data sheet in next page)

◎ Contact the Haian technical representative for more details.

eat Study Data Sheet

e Size/Pattern
Serial No.
Pressure

icle Mode
icle Weight
icle Rating Load
icle Max Load Limit

S o.

D th											
中点/CR	ts	ne	e								
Ra me	Tread T ature花纹温度				P				LOA EA	DU REA	ONE HAUL
	中点/CR										
Recorded Data									e Round Trip Distance		

热力测试记录表

HAIAN ENTERPRISE
海安企业

轮胎型号/花纹
胎号
原始花纹/mm
剩余花纹/mm
轮胎气压/psi

卡车型号
卡车自重/吨
卡车标准载荷/吨
卡车最高上限载荷/吨

表格编号：

钻孔深度/mm			运行时间（h）	运距（km）	运速（km/h）	备注：				
中点	左侧肩部	右侧肩部								

日期	时 分	胎面温度 C°			环境温度	热态气压	累积公里数	轮胎内部温度	装载地	卸载地
		中点	左侧肩部	右侧肩部						
最高数据记录值									平均往返运距	