

# **GTIIT Construction Safety Manual**

**May.1st 2020 ( Version 01 )**

## PREFACE

Safety is one of the most essential parts of life. Risk is always behind the work in campus. How to work safely is important to every worker in campus.

**Our target is “ZERO INCIDENT”!**

**For achieving this goal, we provide this manual to give you the lowest safety standard for reference. Please read intensively and try to use this guideline into practice.**

**This manual is to provide basic safety guidance for campus operation, does not cover all cases. This manual cannot substitute any project safety plan. This manual cannot avoid the safety requirements of compliance with laws and regulations.**

**If you have questions about the manual content or need further instruction, please come to GTIIT Campus Construction Department.**

### **Our Tenets:**

- Nothing we do is worth getting hurt for!**

## 前 言

安全是生活、工作中必不可少的组成部分。项目内作业过程中涉及各式各样的中高风险内容，如何进行安全、可靠的工作显得尤为重要。

我们的安全目标是“零事故”！

为促进这一目标的实现，本手册为项目内作业提供了最低的安全作业规范和要求，请仔细阅读，并将安全知识灵活地应用到实际工作中。

本手册只是为项目内作业提供最基本的安全指导，并不覆盖所有的情况，也不能代替具体项目的施工安全方案，更不能免除遵守法律法规的安全要求。

如对本手册内容有任何疑问，或需要获取更详细的安全指引，请咨询广东以色列理工学院建设部。

### 我们的信条：

- 一切行为都不能以牺牲安全为代价！

## My Commitment

### 承 诺 书

**Please fill all these contents, remove this page and hand over to  
Campus Construction Department.**

请填写下面内容，然后撕下本页，交给校园建设部保存。

**Name 姓名：**

**Job Title 职务：**

**I have carefully read the GTIIT safety manual, and can strictly abide by its rules.**

我已经仔细阅读广东以色列理工学院施工安全手册，并严格遵守其中的规定。

**I understand that any violation of these safety rules and policies will be subject to  
appropriate disciplinary punishment, or even terminated of employment  
contract.**

我明白如果违反这些安全规定和政策，会受到相应的纪律处分，甚至终止雇佣合同。

**If you are contractor, any violation of these safety rules and policies will be  
subject to terminate the cooperation opportunity with GTIIT.**

如果是安装商，如果违反安全规定和政策，将会影响与广东以色列理工学院合作的机会，甚至终止合作关系。

**Signature 签名：**

**Date 日期：**

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# 1.General Safety Rules

## 一般安全规定

1. No smoking is allowed except in the smoking spot.  
禁止在非吸烟区内进行吸烟;
2. No alcohol during work and in 4 hours before work.  
上班期间不得饮酒, 严禁酒后上班(上班前4小时内);
3. No drinking or eating out of designated area (such as: tea room and canteen).  
禁止在项目内指定区域(如: 茶水间、饭堂)外进行饮食;
4. Gambling, fighting, running horseplay and slapstick are not allowed.  
项目内禁止赌博、打架、打闹;
5. Without safety training or unqualified by the safety training, the employee cannot post of duty.  
未经安全培训或安全培训不合格, 严禁上岗作业;
6. There are vehicle lanes and sidewalks respectively for the vehicles and pedestrians, please take the right way.  
场内人车分道, 行人请走人行道;
7. Taking photos or video is forbidden without permission.  
未经允许, 项目内禁止拍照;
8. Comply with the guide of site safety warning signs and labels.  
遵守场内的任何安全警示、警告标示;
9. Must wear the helmet, safety glasses, work clothes and safety shoes before you enter working area.  
进入施工现场, 必须佩戴安全帽、安全防护眼镜、穿工装和安全鞋等个人防护用品;
10. Everyone should wear the PPE properly as the requirement.  
任何人员应按岗位劳动防护用品佩戴要求, 自觉正确佩戴个人防护用品;
11. The safety guard of the machinery and equipment cannot be removed without permission.



未经允许，禁止任何人员拆除机械设备的安全防护装置；

12. Prohibited illegal operations and illegal command in all circumstances.

任何情况下，禁止违章作业、违章指挥；

13. Before working, if you have any confuse about safety, please stop and consulting your supervisor, back to work till that is confirmed safety.

工作过程中对安全存在任何疑虑，请停止作业，咨询主管，在确保作业安全后，方可进行作业；

14. Never use compressed air beyond 2Kg.f/cm<sup>2</sup> to blow the body.

禁止使用大于2Kg. f/cm<sup>2</sup> 的高压压缩气体吹扫身上的灰尘；

15. Special operation personnel must have the operation license. Any unqualified person is not allowed to do those tasks: such as forklift driver, electrician work, lifting operation, welding work, operate compressed vessel and containers etc.

特种作业人员执证上岗，禁止无证从事特种作业，特种作业有：叉车驾驶、电工、起重作业、电焊作业、压力容器操作、压力管道操作等等国家要求持证上岗的特殊岗位；

16. Any injury, incident, unsafe behaviors and unsafe conditions should be reported to the project management without any concealed;

任何伤害、事故，以及发现不安全为和不安全状态，应主动上报项目管理人员，不得隐瞒事故或事故情节；

17. The firefight equipment is prohibited to use unless any emergency situations.

非紧急情况，禁止使用配备的消防器材；

18. Everyone should be familiar with site emergency facilities of working area, and can properly use in emergency situations.

施工人员应熟悉工作区域的应急设施存放位置，并能于紧急情况下正确使用；

## 2. Qualification and Training

### 人员资格及培训

Special equipment operator must have the license issued from Gov. when they operate special equipment. Such as:

特种作业人员必须按照国家规定持证上岗，如：

1. crane operator license for mobile cranes

起重人员

2. Operator for scaffolding installation

高空作业脚手架搭设人员

3. Operator for Electrical work

电气作业

4. Operator for welding and gas cutting

焊接及切割作业人员

5. Operator for forklift

叉车驾驶人员

6. Vehicle driver

机动车辆驾驶人员

7. Vehicle driver license

机动车驾驶证



The following managers must be qualified and get relevant license in accordance with National regulation, such as:

以下管理人员必须按照国家规定持证上岗，如：

- The first responsible person  
主要负责人；
- The responsible person for safety  
安全负责人；

**the following safety training for staff must be carried out by contractor themselves.**

**以下安全培训必须由承包商自行完成。**



- Safety orientational training including: company level (Site safety orientation training), subcontractor level and team level  
新进人员的三级安全教育：项目级、分包公司级、班组级；
- Safety training for transferring and returning personnel  
转、复岗人员的安全培训；
- And any special position or work such as: work at height, hot work and electrical safety etc.  
及特殊岗位及工种的专项安全培训，如高空作业、热工作业、用电安全等

All training must have detailed records, all original copy of certificates and records must be copied and kept in project Campus Construction Department accordingly.

所有的培训都要有详细的记录，所有证书和记录的原件提交给项目建设部办公室审查，并对其复印件进行存档备查。

Requirement for the temporary project personnel:

对于项目内临时项目的作业人员要求：

1. Contractor must be competent physical, the following personnel shall not make special operations, such as hypertension, Heart Disease, Epilepsy, and Acrophobia appeared symptoms.  
承包商所有人员必须具备胜任工作的体格，如有高血压、心脏病、癫痫、恐高症症状的人员不得进行特种作业。
2. Contractor companys must buy effective commercial insurance for their workers.  
承包商公司必须为其作业人员购买有效的工伤劳动保险。
3. All Contractors must apply for the contractor operating license at site project safety office.  
所有承包商入场时，必须到项目安全办公室办理承包商作业证。
4. Age requirements: under the age of 18 or more than 55 years of age persons are prohibited from participating in site construction operation.  
年龄要求：未满 18 周岁或超过 55 周岁的人员禁止参与现场施工作业。

## 3. Job Hazard Analysis

### 工作危害分析

#### Job Hazard Analysis (JHA) 工作危害分析

JHA is designed tool for risk assessment. After confirming work includes high or middle risk, participant should use the "Job Hazard Analysis Table" to describe each job step, and their potential risk of each step in contents of the corresponding control measure, so that the risk is eliminated or reduced to acceptable level.

工作危害分析是设计用于管理工作中风险的工具。在进行一项经评估并定位中高风险的工作之前，参与作业的员工需在“工作危害分析用表”上描述每一作业步骤、并针对每步骤中潜在的危险的内容制定相应的控制措施，从而使风险被消除或者降低到可接受范围之内。

#### Advantage of JHA 工作危害分析的好处

- (a) It is a systematical method for controlling risk behind daily work.

通过系统的方法管理日常工作中的安全风险；

- (b) It can enhance participants' ability at risk identification (worker always know better than anyone else for his work)

参与作业人员进行工作危害分析，有助于危险源的识别；（他们比任何人都更了解自己的工作）

- (c) It can improve people's safety awareness, understanding and control measures for existing risk behind daily work.

提高员工的安全意识、对作业安全要求的理解、以及对日常工作中所存在的风险及控制措施的认识。



### JHA steps 工作危害分析步骤:

- (1) For all works having certain risk need implement JHA.  
对所有具有一定安全风险的工作都需要进行作业安全分析。
- (2) When preparing JHA, JHA team should invited experienced experts and employee.  
在编写工作危害分析时, 应请对该工作有丰富经验的员工参与一起编写。
- (3) When preparing JHA, first step is to write down each work step, these steps should be written in the "what to do" rather than "how to do". Before the finished all work steps, don't start hazard identification.  
在编写工作危害分析时, 首先按顺序写出每一作业步骤, 这些作业步骤应写成“做什么”而不是“如何做”。在写完所有作业步骤之前, 不要开始进行危险源识别。
- (4) When identifying hazard, risk source list (what provide the risk). To avoid this kind of word to describe, such as "injured", it is general description.  
在进行危险源识别时, 列出危险源(施害物及部位)一定要足够具体。要尽量避免使用如“人员受伤”一类笼统描述。
- (5) when selecting the control measures for risk sources, please refer to risk control level:  
当选择对危险源的控制措施时, 考虑风险控制的等级:
  - Elimination  
消除
  - Substitution  
替代
  - Engineering control  
工程控制
  - Segregation  
隔离维护
  - Procedure Managment  
管理控制 (程序控制)
  - Personal Protective Equipment  
PPE 个人防护用品

By these kinds of measures, we can control or reduce the possibility and consequences of incident to an acceptable level.

等手段降低意外发生的可能性和一旦发生时后果的严重性,将危险控制到一个可接受的程度。

To avoid the use of "care", "the use of personal protective equipment", appropriate general statement, specific to each key point, how to control the generation risk.

要尽量避免使用“小心”,“使用合适的个人防护用品”等笼统的说法,具体到每个关键点,如何控制风险的产生。

- (6) If JHA is only at paper work, it will never control risk. We must discuss with team members in tool-box meeting, let them know the JHA well.

如果工作危害分析只停留在纸表上,那么它就不能起到对危险源进行控制的作用,一定要利用班前会,将工作危害分析中的内容阐述与所有参与作业的人员。

- (7) During operation, operator must work according to JHA instruction step to ensure that all key risk control measures listed in JHA are strictly implemented.

在作业过程中,一定要按分析中所列的作业步骤按部依序作业,并且要确保工作危害分析上所列的所有的关键风险控制措施都得到充分的执行。

- (8) JHA should be kept improvement continuously through working practice and lessons learning from the accident. It is impossible to be done perfect at one time, it needs to continue to attempt and improve continuously.

工作危害分析应该通过作业实践和吸取事故教训得到持续的改进和完善。不可能一次就能编写完美,需要持续性实验并改进。

## 4. Work Permit

### 工作许可证

In order to ensure high risk operations is under control, workers must get work permit before starting task.

为确保项目内所有的中高风险作业在控制之中，作业人员必须在施工前获得工作许可才可以进行。



No.	Permit Type 许可类型	Permit Scope 作业范围
1	<b>General Work</b> 一般工作	<b>Any works related to high and middle risk</b> 所有类型的中高风险施工作业
2	<b>Work at Height</b> 高空作业	<b>Any works involved working at height</b> 所有高空作业的工作
3	<b>Lifting</b> 起重作业	<b>Any works involved lifting (except hoist operation)</b> 所有使用起重机(不包括电动葫芦)的作业
4	<b>Hot Work</b> 动火作业	<b>All welding / gas cutting / grindeing works</b> 所有焊接/切割/打磨作业等动火的工作
5	<b>Cofined space</b> 密闭空间	<b>Any works involved part of body access into confined space</b> 所有身体任何部位进入密闭空间
6	<b>Excavation</b> 挖掘作业	<b>All excavation works' depth is more than 30cm</b> 所有开挖地面深度大于等于 30cm 的破土作业
7	<b>Pipe Breaking</b> 开管作业	<b>Dismantle or open pipeline</b> 所有拆卸或者打开管线的作业
8	<b>Electrical work</b> 电气作业	<b>Work for charged device or electrified wire etc.</b> 在通电导线上或者带电设备上作业等

#### (1) WP application 许可证的申请

When applying for Work Permit, please fill in work content with actual situation, such as: work placed, tools, working time, safety measures and personal protective equipment etc.

工作许可证申请，如实填写工作内容、工作地点、所用工具、工作期限以及本次工作所应采取的安全措施和个人劳动保护用品等。

## **(2) WP release 许可证的签发**

- Before issue WP, WP approver must check the working area.

在签发许可证之前，许可证批准人应对施工现场进行检查；

- You must get WP approval and applicant's signature on permit paper before you start working.

只有许可证批准人和申请人都在许可证上签名才可以开始工作；

- The applicant must communicate those safety measures in tool-box meeting to ensure each worker are aware of the work content

工作许可证申请人在施工前必须和施工人员开工作前安全会，沟通工作许可证上的要求，确保每个施工人员都清楚工作内容；

- The WP applicant must take charge of ensuring that all the working staffs strictly comply with all requirements of the permit.

许可证申请人应负责确保整个施工期间内，所有作业人员严格遵守许可证上的所有要求。

## **(3) Before start working 工作进行时，**

- The first page must post at WP control center.

许可证的第一联必须在许可证控制中心(项目管理办公室)；

- The second page should obviously post at working area.

许可证的第二联必须在作业区域现场显眼处张贴。

## **(4) After completion 工作完成后，**

- WP applicant must return the second page to WP control center and close this WP.

施工作业人员必须到许可证控制中心关闭工作许可证。

## **(5) WP Time Limit 许可证期限**

- The valid period of every WP cannot be more than 12 hours. If need to extend the working time, WP form must return to WP control center for re-approval and issue.

工作许可证的有效期限最长不得超过 12 小时，如果超过规定的有效期，则需要延期重新签发工作许可。

#### (6) Invalidation of WP 许可证的失效

In following situations, the issued WP will expire. If arise working requirement, you must apply for a new work permit:

在发生以下情况时，已签发的许可证将失效，如果需要进行工作则需要重新申请新的工作许可：

- WP applicant (holder) changes  
许可证持有人/申请人变更
- The whole working team changes  
整个施工团队人员发生变更
- stop working and the area without monitor for more than 30 minutes  
工作停止超过 30 分钟并现场无人留守
- working environment changes  
现场工作环境发生变化
- Incident or Near Miss happen at working area or vicinity  
工作现场或附近发生事故或者未遂事故
- When the emergency alarm is sounded, all work permits should be stopped  
当紧急警报响起，所有的工作许可证立即结束
- Without following working requirements for operation  
未按许可要求进行作业
- Meet the Work Permit expiration without application for extension  
作业时间到期未进行延期申请

## 5. Safety Meeting

### 安全会议

Safety meeting is an effective method to share safety experience, information communication, clarify responsibility, brief safety training and incident lesson learn.

安全会是进行教训分享、信息沟通、明确职责、安全培训和事故总结的有效方法。

#### **Safety meeting includes**

项目内主要的安全会有

##### (1) Morning Meeting

###### 每日班前会

Before shift handover meeting, shift leaders should ask all team members attend and discuss the main working contents include:

每次工作前交班会议，由班组长主持，所有参与工作的人参加。会议讨论的主要内容包括：

- assign the daily work and discuss daily working plan  
分派当日工作和交流作业方案；
- Discuss the risk behind work and their control measures

工作中潜在的危險、相应的预防措施及注意事项；

- Sharing incident content  
事故案例分享。



##### (2) Safety Council Meeting

###### 项目安全委员会

Every month's Site Safety Council Meeting, chair by the PROJECT SAFETY OFFICE department heads, all safety committee members, and a staff representative attend. The major contents include:

每月举行一次安全委员会例会，由项目安全办公室主管主持，所有安委会成员及一名员工代表参加。会议讨论的主要内容包括：

- review the current month'HSE performance and major problems



回顾当月的安全表现和存在的主要问题；

- analyze the solution for remaining problems need to support  
分析存在问题的解决方案；
- Discuss the status of corrective actions of incident  
沟通隐患整改情况；
- Sharing incident lesson  
分享事故教训；
- Key works in next month  
下月的安全工作重点。

**(3) Occasional meeting for incident sharing**

**不定期的事故分享会**

- Sharing accident contents and lessons learned  
分享事故内容及从中吸取的教训
- Sharing accident corrective measures to develop preventive measures  
分享事故的纠正措施，制定项目内预防措施
- Improve employee safety awareness and risk identification capabilities  
提高员工的安全意识和风险辨识能力

All Safety Council needs to take flexible way to inspire employees to actively participate in discussion.

所有安全会议需要采取灵活多变的方式，激发员工积极参与讨论。

All Safety Council should have detailed records for its meeting content and personnel involved in signature.

所有安全会议都要有详细的记录及参与人员的签名。

## 6. Personal Protective Equipment

### 个人防护用品

Personal Protective Equipment (PPE) :

In order to protect people against incidents or mitigate injuries and occupational hazards, it is necessary for personal to wear defensive and protective equipment.

PPE is the last line of defense to protect worker.

是指保护人员为免遭或减轻事故伤害和职业危害所必备的个人随身穿（佩）戴的防御性装备。

个人防护用品是保护人员安全的最后一道防线。

General Requirement for PPE use

一般个人防护用品的要求



(1) When entering GTIIT, the minimum requirement for PPE is:

进入项目内，人员的个人防护用品最低要求是：

- Safety Helmet: Comply with relevant National standards of helmet, must be tightened back hoop, fasten your chin-strap, contractor's helmet must have their company name or logo.

安全帽：符合安全帽相关标准要求；必须拧紧后箍，系好帽带，佩戴整齐；安全帽必须有分包商公司名称或标志。

- Safety glasses: Comply with relevant National standards of safety glasses.

安全眼镜：符合岗位的相关标准要求。

- Safety Shoes: Comply with relevant National standards of safety shoes, Anti-smashing, anti-piercing, and anti-skid.

安全鞋：符合相关标准要求，防砸、防刺穿、防滑。

- Uniform: Should be long sleeves, long pants, buttoned cuffs, tightening loose clothing.

工作服：必须为长袖、长裤的工装，扣好袖口，束紧宽松衣物的下摆。

(2) PPE requirement for high frequency special operations:

项目内高频率特殊作业个人防护用品要求:

- Welding: welder facial shield, N95 mask, welder glove  
焊接作业: 防护面屏、N95 防尘口罩、电焊手套。
- Grindging: facial shield, N95 mask, ear plugs  
打磨作业: 防护面屏、N95 防尘口罩、耳塞。
- Painting: filter aspirator (half mask)  
油漆作业: 过滤式呼吸保护器。
- Falling arrest protection:  
坠落防护:
  - Safety harness (full body harness)  
安全带 (全身式安全带)
  - Double safety hooks  
双钩挂环;
  - Retracting falling arrest device (  $2\text{m} < \text{working height} < 6\text{m}$  )  
自缩式防坠器 (  $2\text{m} < \text{作业高度} < 6\text{m}$  )
  - Shock absorbing lanyard (working height  $< 6\text{m}$ )  
缓冲带(作业高度 $>6\text{m}$ )
  - Anti-skid safety shoes  
防滑安全鞋。
- Handling sharp material: anti-cutting glove  
处理尖锐物品: 防割手套

Before wearing PPE, please do the daily check. After using, keep good maintenance. When discovering any defective or damaged, please replace with good one immediately.

个人防护用品在每天穿戴使用前要检查, 使用后要做好维护保养, 发现有缺陷或破损要及时更换。

## 7. Safety Signs

### 安全标志

Safety signs visually express workshop hazards or safety requirements, to remind all people attention and compliance. Safety signs include prohibition, warning signs, and safety guiding signs, all people must comply with these safety requirements.

安全标志牌直观地表达现场隐患或安全要求，提醒入场人员注意或遵守。安全标志分为禁止、警告、指示标志，所有人员必须遵守安全标志要求。

#### (1) The setup requirements for safety signs

##### 安全标志牌的设置要求

- Signs should be set at obvious area that is involved with work related danger.  
标志牌应设在与工作危险有关的醒目地方；
- Sepcified signs should be located obviously in the appropriate hazardous locations or involved equipment.

局部信息标志应设在所涉及的相应危险地点或设备(部件)附近的醒目处；

- Signs should not be located at doors, windows, racks and other movable objects, so as not to move the objects to make the safety signs invisible.

标志牌不应设在门、窗、架等可移动的物体上，以免这些物体位置移动后，看不见安全标志；

- Obstacles cannot impede the signs for recognizing and reading.

标志牌前不得放置妨碍认读的障碍物。



(2) Content Requirement for Safety Signs

安全标志的内容要求

Forbidding 禁止类				
	Forbid eating 禁止饮食	Forbid photograph 禁止拍照	Forbid smoking 禁止吸烟	
Warning 警告类				
	Corrosion caution 当心腐蚀	Toxic caution 当心中毒	Radiation caution 当心电离辐射	
Instruction 指令类				
	Must wear helmet 必须戴安全帽	Must wear safety glasses 必须戴防护眼镜	Must wear safety shoes 必须穿防护鞋	Hold handrail 使用扶手
Safety facility 安全设施				
	Emergency exit 出口	Muster point 紧急集合点	Safety shoes and eye washer 紧急喷淋和洗眼器	
Fire fighting facility 消防设施				
	Fire extinguisher 灭火器	Fire alarm button 火灾警报按钮		

(3) **Safety Signs setted in front of project entrance**

**进入项目施工现场前的安全标识**

Before entering working area of project, please make sure you wear the PPE as mentioned requirement.

进入项目施工现场前必须根据安全指示标志内容，配备好个人防护用品。



**Signs in front of Project Site**

**进入项目施工现场前安全提示：**

- Must wear safety helmet  
必须戴安全帽
- Must wear safety glasses  
必须戴防护眼镜
- Must wear safety shoes  
必须穿防护鞋
- No smoking  
禁止吸烟
- No drinking and eating  
禁止饮食
- Do not take pictures  
禁止拍照
- Do not use cell phone  
禁止使用手机
- Forklift speed limit is lower than 5 km per hour  
限速 5 公里/小时

## 8. Incident Report

### 事故报告

When incident happens, please report to your supervisor to handle it without any delay.

现场发生事故时，必须立即报告，并进行处理。

If anyone finds themselves or others are in risk, they must immediately remind others and eliminate the risk. In case this risk cannot be resolved, must be immediately reported to your supervisor, prohibite trying to handle alone.

任何人发现自身或者他人处于危险环境中时，必须及时提醒他人和消除危险。

如遇到自己不能解决的，必须立即上报现场管理人员，禁止强行处理。

- (1) When incident happen, it must be reported to project management immediately.

现场发生任何事故后，必须立刻通知现场管理人员；

- (2) When incident happens, discover and on duty management staff must response immediately to handle and prevent incident to expand by effective measure.

事故发生者或现场负责人应快速、有效的处理和进行采取预防事故扩大的措施，立即消除隐患；

- (3) Keep tracking and make sure the solution can be effective, if invalid, re-enact to prevent incident happen.

进行持续性监督，跟踪隐患处理措施是否有效，如无效则必须重新制定，做持续性改进，防止事故发生；

- (4) Processed immediately in the preparation or completion of controlling, the on-site responsible person must protect the scene of incident, support the incident investigation.

在准备或完成立即处理措施时，现场负责人必须保护好事故现场，协助事故调查。

- (5) Any injury or incident, no matter how small it is, must be reported and

investigated. The incident investigation report must be submitted to Project safety Office within 24 hours. (Root Cause Analysis) .

任何受伤或者事故,无论有多小,都必须报告并调查,必须在事故发生的 24 小时之内,向项目安全管理部门提交详细的事故调查报告(事故根本原因分析);

Report content including 报告内容包括:

- Incident location and time of occurrence  
发生地点和时间
- Incident Type  
事故类型
- Victim's condition  
人员受伤情况
- Reporter name and contact way  
报告人的姓名和联系方式
- In case of large spills, notify all affected persons  
如是大面积废物或化学品泄漏,同时通知可能受影响区域的人员;
- In case of fire or serious Natural Disasters, please trigger the internal alarm and inform all affected persons  
如发生火灾、台风等重大自然灾害时,发出内部报警信号,告知相关区域的人员疏散至安全位置。

For specified contact way for external and internal key person or organization, please refer to Appendix I:

具体的紧急联系方式请查阅附录一:场内外主要人员及机构联系方式



## 9. Segregation

### 危险隔离

Before working, please use fence, warning tape or warning cone to segregate the working area. Without permission, prohibit entering the barricade area.

对各种危险区域进行隔离，用围栏、警示带或警示筒等将危险区域进行有效的隔离，未经许可，禁止进入隔离的区域。

Segregation includes two kind of method: soft warning barricade and hard protective barricade.

危险隔离分为警示性隔离和保护性隔离。

#### (1) Soft Warning Barricade 警示性隔离

Reminding the segregated area is dangerous for passengers. Such segregation method cannot provide the mandatory fence to stop accessing. It is only made by warning belt and warning cone.

提示隔离区域内存在危险，此类隔离不提供强制性围栏将人员挡在外围，隔离方式如警示带。



#### (2) Hard Protective Barricade 保护性隔离

It can provide physical protection and block at the periphery, play physical enclosure for user, such as fixed railing, cover to avoid falling.

警告并提供身体保护，强制性的将人员挡在外围，起物理性围护作用，隔离方式如固定栏杆、盖板等，以避免坠落。



### (3) General requirement 一般要求

- (a) Segregate area should cover the area that has falling risk possibility.  
对作业区域下方存在坠物危险的区域进行隔离；
- (b) When lifting, the segregated range must be greater than the radius of crane activities region;  
在起重作业时，隔离范围必须大于起重机吊臂活动半径以外的区域；
- (c) When excavating, the segregated range must include the pile of soil;  
挖掘作业时，隔离范围必须包括堆土区；
- (d) The segregation must be set with safety signs;  
安全隔离要配合安全标志牌使用；
- (e) Warning tape cannot tie on firefighting equipment, electrical equipment, cable, valves and other operation equipment. It should be tied at solid fence, support or structure.  
警示带不可以系在消防设备、电气设备及电缆、阀门等会妨碍其操作的设备上，应系在稳固的围栏、支架或结构物上。

Energy: include electrical energy, mechanical energy, hydraulic energy, kinetic energy, chemical energy, heat and other energy.

能源：是指包括电能、机械能、液压能、气动能、化学能、热能和其他能源。

“Lock Out Tag Out” is one kind of hard protective barricade.

挂牌上锁（LOTO）就是一种保护性能源隔离方式。

Before repairing equipment, remember to segregate all energized parts according to LOTO requirements. After taking LOTO, equipment should not be in re-energy state until the

termination of LOTO. Segregated equipment cannot conduct any operation.

维修设备前，根据现场要求，使用锁具将能源控制部位进行能源隔离。挂牌上锁后，设备处于能源隔离状态，直至解除牌锁前，被隔离设备均无法进行任何操作。

Make sure the person who locks the lock can open the lock only to avoid incident, especially for shift handover.

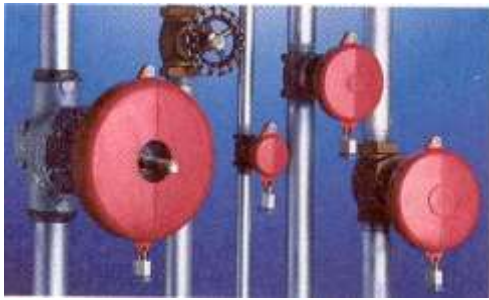
确保只有锁的持有人能打开锁，以免发生意外，尤其是在工人换班时。



LOTO type 挂牌上锁的类型:



## Lock out gas cylinder 气瓶上锁



## Lock out valves 阀门上锁



## Lock out valves 阀门上锁



## Lock out breaker 断路器上锁



## Lock out cable 设备电源上锁

### Information on tag 挂在上锁装置上挂牌信息包括:

- The name of segregated equipment  
隔离装置名称
- Who provide the segregation  
隔离人姓名
- The segregater's phone number  
隔离人电话
- The LOTO time limit  
设备隔离期限
- other remark for segregation  
设备隔离的说明

<b>危险</b> <b>DANGER</b>
<b>禁止操作</b> <b>DO NOT</b> <b>OPERATE</b>
此设施已锁定 未经授权禁止解除 This energy source has been LOCKED OUT! Unauthorized removal of this lock/tag is prohibited.
隔离说明REMARKS for Isolation: _____ _____

<b>危险</b> <b>DANGER</b>
<b>禁止操作</b> <b>DO NOT</b> <b>OPERATE</b>
此锁定/挂牌的移除 由以下人员移开 This lock/tag may only be removed by:
隔离装置 Isolated Unit: _____
隔离人 Isolated By: _____
隔离人联系电话 phone: _____
隔离期限 Isolation Period: _____



## 10. Lifting safety

### 起重安全

Lifting: normally, lifting is heavy lifting and transfer operations by hoisting equipment and manpower. The lifting equipment mainly mentioned in GTIIT is the movable crane.

起重作业：利用起重设备和人力进行重物起吊和转移等作业；项目内起重设备主要指流动式起重机。



#### General Requirement 一般要求：

##### Before Lifting 起吊前：

- (1) All lifting work should have the special working plan includeing JHA.  
所有的起重作业应有专项施工方案，包括作业安全分析；
- (2) All lifting operators should be qualified and got the lifting operation license.  
起重操作人员和司索信号人员，必须按国家规定持证上岗；
- (3) All lifting equipment or machines should be passed its annual inspection done by Gov.  
起重机械必须在法定的检验期内，并有检验合格证；
- (4) All lifting machine and accessory must be at good condition and checked before using.  
起重机械和机具必须在作业前进行检查，状态良好；
- (5) When wind force scale is greater than grade 6 (Beaufort scale: 10.8m/s to 13.8m/s),

the outside lifting must be stopped and tighten machine and all accessoryes.

当风力大于 6 级(蒲氏风力等级)时，禁止起重作业，起重设备及配件均做好固定；

- (6) Before lifting, the lifting operator must check brake, hook, wire rope and other safety devices.

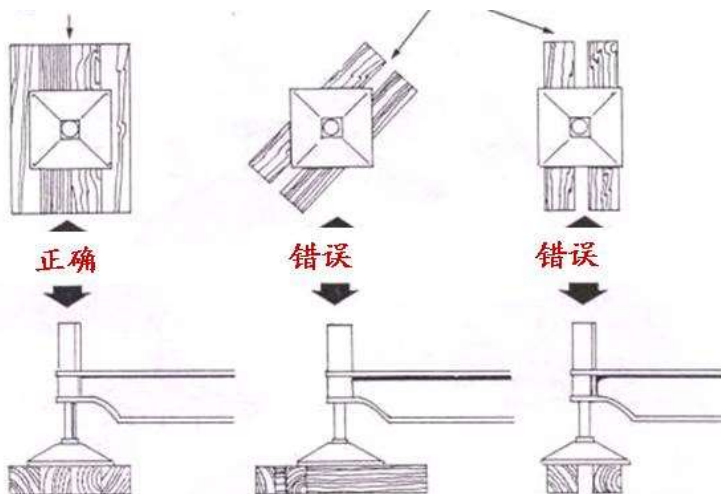
起重前，起重人员应对制动器、吊钩、钢丝绳和安全装置等进行检查；

- (7) Before lifting, must check the weight of load to guarantee its weight will never exceed crane's rated lifting capacity.

起重前，必须检查载荷重量，确保载荷不超过其额定起重能力；

- (8) Before lifting, the parking position must be even, extend all legs out to support the whole crane.

起重前，停车位置必须平整，平稳固定好支腿方可开始吊运工作；



支脚的固定方式



- (9) If the illumination is bad to affecting normal working at lifting area, suspend the lifting work.

工作场地昏暗，无法看清场地、被吊物情况和指挥信号不明确的情况下，禁止起重作业；

- (10) If slings and accessory binding are not tightened to meet the safety requirements, never start lifting operation.

吊索和附件捆缚不牢，不符合安全要求时，禁止起重作业。



**During lifting 起重期间:**

- (1) Never provide illegal instruction.  
禁止违章指挥;
- (2) Never use a damaged sling.  
不要使用被损坏的吊带。
- (3) When lifting, never working at lifting object.  
起重时, 禁止在吊物上进行加工或操作;
- (4) Never lift up those embedded objects that their weight is unknown.  
禁止吊拔重量或拉力不清的埋置物体;
- (5) Never pull or drag the lifting load.  
禁止歪拉斜吊;
- (6) Never use of lifting machinery as personnel carriers or elevator;  
禁止使用起重机械作为人员的运输工具;
- (7) Never put unpacked material on lifting object, never allow people stand on the lifting object.  
禁止被吊物体上有人或松散物;
- (8) Never directly lifting oxygen, acetylene cylinder or any explosives goods.  
禁止直接起吊氧气瓶、乙炔瓶等具有爆炸性物品;
- (9) In order to prevent loads slipping from wire rope, keep rubber or other anti-slip pad between the lifting goods and lifting rope and bundle all lifting loads.  
捆绑、吊挂不牢或不平衡而可能滑动, 棱角处与钢丝绳之间未加补垫时,  
禁止起重作业;
- (10) Never transfer loads over any passengers. Never allow personnel to stand under the crane.  
禁止吊物从人的上空通过, 吊臂下禁止站人;
- (11) Never allow one command cranes or multi-commanders for one crane.  
禁止一人指挥多台起重机或多人指挥一台起重机;
- (12) When lifting, never receive calls or listen music.  
禁止起重人员作业期间接打电话和听音乐等不安全行为;
- (13) When lifting, never leave from the working area, if necessary, and must do well at

handover to ensure smooth the lifting safety.

禁止操作人员作业期间无故私自离岗，如需离开必须做好交接，确保工作安全进行

- (14) Mobile cranes, parking must be formed before work, fixed crane outrigger.

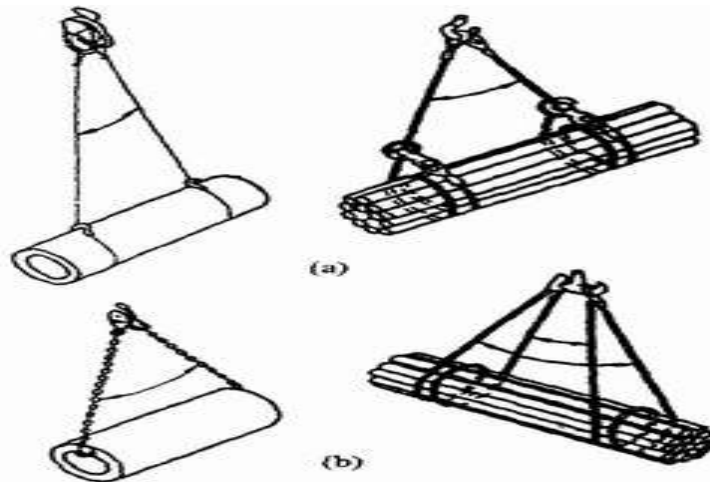
流动式起重机，工作前必须平整停车场地，固定好起重机支腿；

- (15) When lifting, never do the maintenance job.

起重作业时，禁止进行检修；

- (16) When lifting, the angle of two wire ropes should be less than  $120^{\circ}$  to avoid overload at lanyards.

吊挂时，吊钩挂绳之间的夹角应小于  $120^{\circ}$ ，避免吊挂绳超负荷；



(a)双支单双圈穿套结索法 (b)吊篮式结索法

- (17) Never lift up loads by one wire rope.

禁止使用单挂绳起吊重物；

- (18) All lifting loads should be kept one messenger rope at least to prevent loads or ropes twining around.

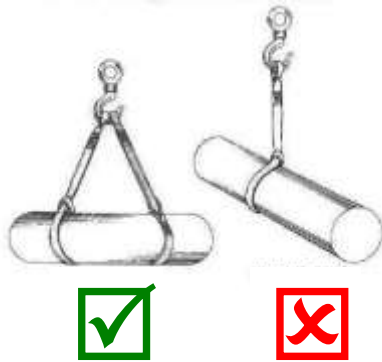
所有起吊物必须至少用一条溜绳做导向，禁止溜绳打结或缠绕在手或者身体上；

- (19) If the weight of loads is close to the rated load of crane, before lifting, try to lift up to short stroke and find the gravity center of loads, and then smooth lift.

起吊重物接近或达到额定载荷时，吊运前用小高度、短行程试吊确定吊物



重心后，再平稳吊运；



- (20) When lifting, boom, spreader, aids, wire rope, wire cable and traction rope etc. all parts of crane should be kept a minimum distance away from high-voltage power cables.

起重机工作时，臂架、吊具、辅具、钢丝绳、缆风绳及重物等，与输电线的最小距离不应小于下表的规定；

输电线路电压 V (kV)	<1	1~35	$\geq 60$
最小距离 (m)	1.5	3	$0.01 (V-50) + 3$

- (21) Never use the height limit to make stop.  
禁止使用极限位置限制器停车；
- (22) When lifting, never adjust the braker.  
禁止负载时，调整起升、变幅机构的制动器；
- (23) When dropping down the lifting hook, the minimum of turn number for wire on the winch should be more than 2 rollexcept those fixed rolls.  
当吊钩处于工作位置最低点时，钢丝绳在卷筒上的缠绕，除固定绳尾的圈数外，不得少于 2 圈。
- (24) When lifting, if power off, the controller handle should be pulled at null. When resuming, recheck and ensure everything is at good condition.  
工作中突然断电时，应将所有的控制器手柄扳回零位；在重新工作前，应检查起重机动作是否都正常；
- (25) When two or more cranes lift the same weights, the wire rope should keep vertical. All cranes should run synchronously. If all cantt achieve this requirement, all cranes

should reduce their rated lifting capacity to its 80% of rated loads.

用两台或多台起重机吊运同一重物时，钢丝绳应保持垂直；各台起重机的升降、运行应保持同步；各台，如达不到上述要求，应降低额定起重能力至 80%。

- (26) After completing lifting work, keep hooks, lifting ropes and all accessories at their original design position.

汽车吊作业完毕后，禁止将吊臂处于工作状态；



**For accessory requirement, please refer to Appendix 5.**

**起重机具的要求：**机具包括：钢丝绳、吊钩(起重机具检查标准见附录五)。

### (1) **wire rope 钢丝绳**

- The testing of crane should be done once a week, and keep records.  
现场使用起重机具每周至少进行一次检验，并保存记录；
- The replacement of accessory, new accessory and tools must be the same type. If you have to use different type, you must ensure that the new accessory should not be lower than the original use of one's performance and quality.  
更换机具时，新机具必须与原机具同类型、同规格；如采用不同类型，则必须保证新机具性能不低于原使用机具性能；
- When using shackle to connect rope, the number of shackle should be prepared according to rope's diameter. Please refer to the below sheet.and should make sure the strength of connection should not be less than 85% of the rope's rated forces.

用绳卡连接时，应满足下表要求，同时应保证连接强度不得小于钢丝绳破断拉力的 85%；

- If use weaving method to connect ropes, the length of weaving part should not be less than 15 times of the rope's diameter and should be more than 30mm. Make sure the strength of connection should not be less than 75% of the rope's rated forces.

用编结连接时，编结长度不得小于钢丝直径的 15 倍，且必须大于 30mm；  
连接强度不得小于钢丝绳的破断拉力的 75%；

钢丝绳直径 (mm)	7~16	19~27	28~37	38~45
绳卡数量 (个)	3	4	5	6

绳卡压板应在钢丝绳长头一边；绳卡间距不应小于钢丝绳直径的 6 倍

## (2) Hook 吊钩

The hook should be companied by manufacture's certificate and technical documents. Hook should be marked with unerased signs.

吊钩应有制造单位的合格证等技术证明文件，方可投入使用。检验合格的吊钩，应在低应力区有不易磨灭的标记。

If the hook is broken, never weld to fix and reture back for using.

吊钩上的缺陷不得焊补；

Never use the hook without safety block.

禁止使用无挡板的吊钩。

### Hook's sign must include:

标记内容至少应包括：

- Rated Load Weight 额定起重量
- Manufacturer Name 厂标或厂名
- Check Mark 检验标志
- Product Serial Number 生产编号



## 11. Hot work

### 动火作业

In project, Hot work includes welding, gas cutting, grinding, drilling etc.

项目内动火作业主要指焊接、切割、打磨、使用冲击钻钻孔等作业。

In project, you can do hot work without hot work permit in designated permanent hot work area.

项目内指定动火区域可不需签发动火许可证直接进行动火作业。

#### **General Safety Requirement for Hot Work 一般安全要求:**

- When doing hot work, safety watcher must monitor the whole working process.  
动火作业必须全程在安全监督员监督下，方可进行；
- The hot work operator must have the relative working license issued by Government.  
金属焊接切割作业人员必须持证上岗；
- Keep flammable or explosive material away from the hot work area more than 5m.  
禁止在动火现场 5 米内或正下方存放可燃或易燃易爆物品；
- Hot work area must be equipped with effective firefighting equipment, and all on-site firefighting equipment should be at good condition.  
动火现场必须配备有效的灭火器材，现场消防设备状态良好；
- When doing hot work at height, must have control measures to hold the falling sparks and use some non-flammable blanket to protect equipment that cannot be removed. Assign one safety watcher to take care the area that is under the hot work area.  
高处动火作业时，必须有火花飞溅防止措施，动火周围和下方应采取防火隔离措施，并有专人在火花落处进行监护。
- After completing the hot work, the safety watcher must stay more 30 minutes at the working area to make sure there is no any smolder happens again.  
动火作业完毕后，安全监督员必须持续监督作业现场 30 分钟，以确保现场再无任何火灾隐患。

#### **(1) Welding 电焊**

- Wear welding gloves, protective masks, with the special safety glasses for welder that its grade should be higher than No. 10<sup>th</sup>.

焊接时需戴上电焊手套，防护面罩，使用不低于10号的滤光安全眼镜；



- Never do hot work at open area in raining day.  
雨天不得在露天电焊。
- In wet area, operator should stand on insulated objects.  
在潮湿地带作业时，操作人员应站绝缘物体上；
- Require a separate and large enough place for hot work.

所有的工作都需要一个单独的并足够大的地方；



- When working, welder must be fixed with the grounding clip.  
电焊机必须使用接地夹接地；
- Grounding clamp or wire must be connected as closely as possible with the welder.  
接地夹子/接地线必须尽可能近地跟焊机连接；
- The wire connecting with welder and weld holder cannot be breakage or disrepair.  
连接焊机与焊把线必须无裸露和破损；
- Always keep welding rod in designated holder, never keep at welder clamp after finishing work.

必须将残余焊条放在合适的容器里，禁止留在焊接钳上；



- Never do welding on steel ladder.  
禁止在金属梯子上进行焊接作业；
- When sudden power outage, you should immediately switch power off.



焊接中突然停电时，应立即切断电源；

- Before moving welder, switch power off first. Never move welder by dragging cables.

移动电焊机时，必须先切断电源，禁止拖拉电缆来移动焊机；

- Welding area must be segregated to prevent electric arc injury.

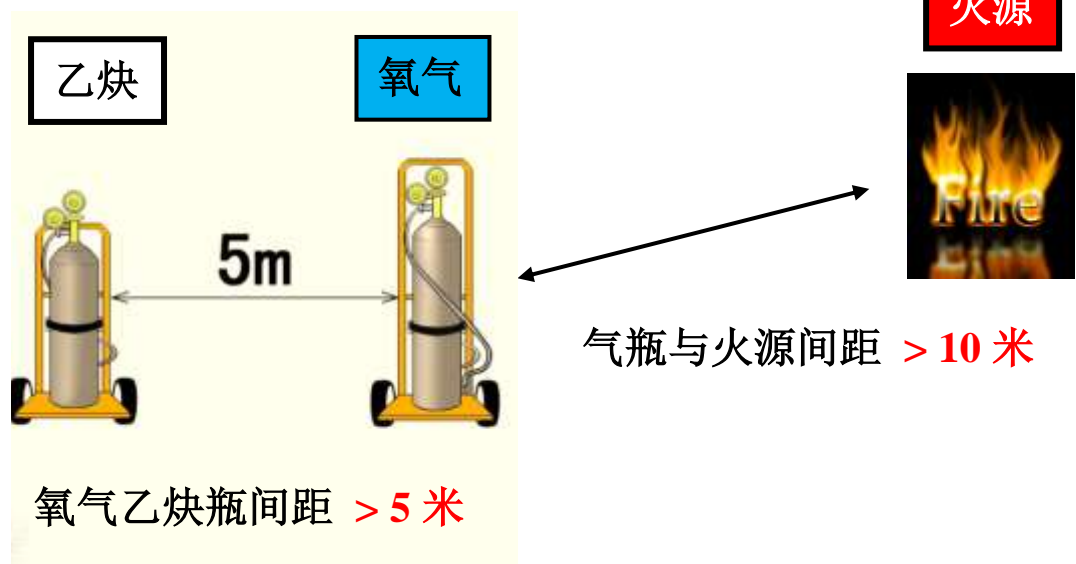
焊接区域周围必须进行隔离，防止弧光伤人。



### Gas Welding and Gas Cutting 气焊、气割

- Never keep oxygen cylinder close to oil or grease.  
油和油脂类物品不得与氧气瓶接近；
- The distance between oxygen and acetylene cylinders should be more than 5 meters at least. These cylinders must be more than 10 meters from ignition sources or sparks.

氧气瓶与乙炔瓶的距离保持 5 米以上距离，氧气、乙炔与明火的距离必须保持 10 米以上距离；



- Cylinders must be protected by good bottle cap, shock absorbing rubber ring. When moving cylinder, handle gently, never throwing, sliding, rolling, or hit the cylinder.  
气瓶必须配戴好瓶帽、防震圈，轻装轻卸，严禁抛、滑、滚、碰撞、敲击；
- Cylinder must be placed upright and fixed to prevent dumping.  
气瓶必须直立放置，并且固定好，防止气瓶倾倒；
- Never expose gas cylinder to blazing sun or rain.  
气瓶应当防止暴晒和雨淋；
- Never mend or weld gas cylinder.  
禁止对瓶体进行挖补、焊接；
- Never use electromagnetic cranes and metal chain sling to lift up cylinder.  
禁止使用电磁起重机和金属链绳吊运气瓶；
- When using acetylene, the pressure in cylinder should not exceed 0.147MPa.  
使用乙炔时，仪表压力不得超过 0.147MPa；
- When connecting the pressure regulator, the valve should be closed immediately after openings slightly, in order to blown off the foreign particles.  
在将调压阀连接到气瓶之前，应当将阀门轻微打开后立刻关闭，把外来的颗粒吹走；
- Before ignition, clean two outtakes (fuel gas and oxygen), open the valve until you get a separate clean gas, and then close valves.  
在点火之前，净化两个通气管（燃料气体和氧气），方法是单独打开阀门直到得到洁净的气流，然后关闭；
- Never use matches, cigarette or lighters, must use designated electronic ignition.  
禁止用火柴、香烟或打火机去点火，使用电子打火器；
- After completing work, all cylinder valves must be closed.  
不使用气瓶时，必须关闭气瓶阀门；
- The valve of compressed air cylinders must be closed tightly during storage, transportation, or using, keep cylinder vertically with support.



压缩空气汽缸必须拧紧，在储存，运输，或使用的时候垂直支撑；

- Gas in cylinder should not be exhausted, oxygen should be left a residual pressure of 0.2MPa, the residual pressure acetylene cylinders as below:

瓶内气体不得用尽，氧气瓶应留有 0.2MPa 的剩余压力，乙炔气瓶的剩余压力：

Environmental Temperature 环境温度 °C	<0	0~15	15~25	25~40
Remaining Pressure 剩余压力 kg · f/cm <sup>2</sup>	0.5	1	2	3

Must install a fire arrestor at acetylene cylinder.

至少乙炔瓶上必须配置防回火装置；

Cylinders should be marked with label for full or empty. Store with category.

气瓶应当用标志识别满瓶或空瓶，并分类存放。

**After completing work and before leaving, please take care about these following steps**

**完成工作或长时间离开工作地点注意：**

After using gas welding, close the valve of acetylene pipe first.

**焊炬**应先关乙炔阀

And then close the valve of oxygen pipe.

再关氧气阀。

After using gas cutting, close the valve of oxygen pipe first.

**割炬**应先关切割氧，

And then close the valve of acetylene pipe.

再关乙炔和预热氧气阀门

Close the valve of cylinders

关闭气瓶阀门

Release the pressure of decompressor

去除减压器中的压力

Release all remaining gas in pipelines

排除管道剩余气体

Close the valve of gas cutting

关闭气焊割阀门

Collect all tools





妥善收拾所有工具

## **Grinding 打磨**

### **Before working 工作前:**

When grinding, except the general PPE, earplugs, half mask (or N95 mask), facial shield.

打磨时，除了一般个人防护用品外还必须另外佩戴耳塞、防尘口罩、防护面屏；

Check grinder and confirm the protective cover is intact.

应对砂轮机进行检查，确认安全防护罩是否完好；

Before mounting the grinding wheel, must check the rated maximum speed is compatible with the grinding wheel spindle speed, grinding wheel should not be cracked or defective.

安装砂轮前，必须核对砂轮允许的最高转速是否与主轴转速相适应，不准使用裂纹或缺损的砂轮；

Chuck diameter shall be not less than  $1/3$  of diameter of grinding wheel, a (1 to 2 mm) soft pad should be filled between grinding wheel and chuck, and pad's outer diameter should be 2mm larger than the clamping.

砂轮卡盘直径不得小于砂轮直径的  $1/3$ ，卡盘与砂轮间应垫上 1~2 毫米的软衬垫，其外径应比卡盘压紧面的直径大 2 毫米；

After installing grinding wheel, and before using, must do the test run.

砂轮装好后，在使用前必须进行试转；

### **During working 工作期间:**

Before adjusting or maintaining, stop the wheel first.

必须在砂轮停转后，才能进行调整或维护、维修；

Never stand facing the wheel to prevent getting hurt by broken wheel debris.

严禁站在砂轮正面操作，以防砂轮破裂伤人；

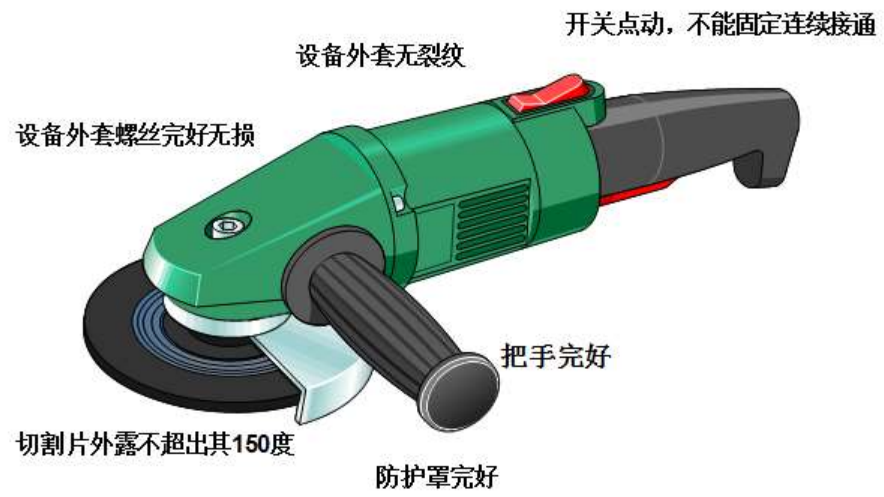
Never use the grinding wheel for cutting, use the cutting wheel for grinding.

非专用端面磨削的砂轮片禁止用于端面打磨；

After work, shut down power and make sure grinder stop running.

工作完毕后，应切断电源，确认砂轮停转后，方可离开岗位。





## 12. Confined Space

### 密闭空间作业

In Project, confined space means working at enclosed space that isn't used for staff work continuously. For example: tanks, sewers, ventilation pipes, and waste water tanks.

在 GTIIT 密闭空间是进入封闭式空间，该场所不用于员工进行连续工作。例如：储存池、下水道、通风管和废水池。

- Access is defined as any part of the body access into the confined space.

进入定义为身体任何部位进入密闭空间。

For example, extend your head into a reactor or manhole.

例如，你的头部伸入反应器检修孔或除尘器内。

- All 1.5m or deeper pits should be defined as confined space. If access is restricted, any pits should be considered as confined space.

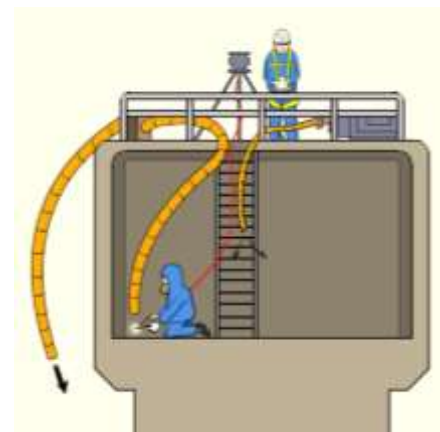
所有 1.5m 或更深的积坑均被定义为密闭空间。如果在空间内进出受到限制，则任何深度的积坑均应认为是密闭空间。

- New container, unused containers or containers containing chemical substances are applicable to the procedure.

新容器，闲置容器或未含有化学物质的容器均适用于该程序。

- The whole working process in confined space must be under supervision.

密闭空间作业必须在安全监督员的全程监督下进行。



**Before working in confined space 作业前：**

#### 1. Eliminate the dangerous source 清除危险源：

- According to the working plan and P&ID, physically isolated all hazards sources that are leaded to confined spaces, such as: electrical equipment, materials in piping, materials in casing and energy supply lines etc.

必须根据施工方案及图纸进行物理性隔离所有进入密闭空间的危险源，如：电气设备、物料管线、保温物料及能源管线等等；

- Before entering confined space, it must be completely emptied, purged, and cleaned all chemical substances (nitrogen, products or raw materials).

必须将密闭空间完全清空、吹扫、清洗且驱除所有化学物质（例如，氮气、产品或原料）；

- For efficient ventilation of confined spaces, if involving explosive atmosphere, but also requires to use explosion-proof fans for ventilation.

对密闭空间进行有效通风，如涉及易燃易爆环境，需要使用防爆风机进行通风；

- Ensure the entrances of confined space remaining open.

确保密闭空间出入口保持畅通；

- Barricade the whole working area.

设置作业隔离区域；

## 2. **Emergency response devices in place** 应急设备到位：

- Confirm whether involving other types of special operations.  
If involves, prepare the rescue devices according to actual situation.

确认是否涉及其他类型的特种作业，如涉及则根据实际情况选定救援设备；

- Operator working in confined space must be equipped with a good condition self-contained breathing apparatus (SCBA), communications equipment, lifelines, portable gas detectors and other tools.

密闭空间作业人员必须配备状态良好的外部供气式呼吸器（或 SCBA）通讯设备、生命线和便携式气体检测仪等工具；

## 3. **PPE for Confined Space** 个人防护用品配备：

- Except general PPE, operator still need for other specific PPE according to actual requirement.

一般 PPE 外，还需要根据具体的工作要求对特殊 PPE 进行选择 and 配置；

- Safety watcher must be equipped the same PPE as the staff operating within the confined space taking.

安全监督员的 PPE 必须和密闭空间内作业人员配置的 PPE 一致；



- Prepare as actual requirement.  
具体根据施工要求进行；

#### 4. Gas Testing 气体测试:

- Analytical instrument calibration should be valid, bump test should be carried out, and make sure it can work correctly before use.

分析仪器应在校验有效期内，使用前应进行碰撞试验，并确保其处于正常工作状态；



- Sampling point should be representative, if the volume of the confined space is larger, testing should be taken from the upper, to middle, and then lower parts of each space.

采样点应有代表性，容积较大的受限空间，应采取上、中、下各部位取样；

- Before entering confined space, gas testing must be done and confirmed the gas is in designated range.

进入密闭空间前，必须进行气体测试，并确保在允许范围内：

- Concentration of oxygen should be in the range from 19-21%. In enriched oxygen atmosphere, never work at the condition that oxygen concentration is higher than 23.5%.

氧含量一般为 19%~21%，在富氧环境下不得大于 23.5%；

1. The concentration of combustible or explosive gas must be ZERO.(the alarm limit is 10% of its Lower Explosive Limit)

易燃易爆气体浓度为 0 (设备报警极限为 LEL 最低爆炸极限的 10%)

2. The concentration of toxic gas must be ZERO. (sample gas are carbon monoxide and hydrogen sulfide)

有毒气体（物质）浓度 0%，(样品气为 CO 和 H<sub>2</sub>S)；

- Before first entry, or re-entering after leaving, the air inside the work space must be re-tested and ensure in the designated range.

初次进入或离开后再次进入之前，必须对工作区域内空气进行测试；

- Testing process can be continuous or intermittent, if handling with intermittent test, the testing frequency should not be less





than one time per hour.

过程检测可以是持续性，也可以是间歇性，间隔测试应频率最低不得少于每小时一次。

**During Operating in Confined Space 作业期间：**

- If the job interruption is more than 30 minutes, gas testing should be done again.  
作业中断超过 30 分钟应重新进行气体测试；
- If there is a risk for continuous release of hazardous substances, this space should be kept in constant surveillance.  
对可能释放有害物质的受限空间，应连续监测；
- If abnormal situation occurs, operation must be stopped immediately, operator must evacuate to muster point. After sampling through the whole confined space till sample analysis is qualified, and then operation can be resumed.  
情况异常时应立即停止作业，撤离人员，经过对现场处理，并取样分析合格后方可恢复作业；
- Operator must maintain close contact with safety watcher. The frequency of contact with each other, between the operating personnel and safety watcher, should be decided in consultation before starting operation.  
作业人员必须和安全监督员保持密切联系；彼此间联系频率由作业人员和安全监督员协商决定；
- Never place gas cylinder in confined space.  
禁止将气瓶放置在密闭空间内。

**After completing operation 作业完毕后：**

- The waste materials and tools within the confined space must be cleaned out.  
将密闭空间内废物料及工具清理出作业区域；
- Before leaving, recover the site without danger according to requirement.  
确认现场按要求恢复，并无任何危险后，方可离开现场。



## 13. Excavation

### 挖掘作业

Excavation: Excavation refer to any ground excavation, excavation, drilling, piling and other ground-breaking operations.

挖掘：挖掘作业指的是任何地面开挖、掘进、钻孔、打桩等各项破土作业。

- Excavation machinery drivers must have the special operations license.

挖掘机械司机属于特种作业人员，必须持证上岗。



- Before excavation, project safety officer should confirm the specific location of underground pipeline / cable / facilities (if necessary) in order to approve the working plans and protective measures.

挖掘前必须由项目安全管理人员确认及批准，确定地下管线/电缆/设施(若有)的具体位置，以便采取相应的施工方案和防护措施。

- Without confirmation from project safety officer, never carry out excavation work.

未经项目安全管理人员确认、批准，禁止实施挖掘作业。

- All on-site excavation area must have suitable protective barricade against personnel and vehicles access into the work area.

现场所有的开挖区域必须有合适的保护性隔离防护，防止人员及车辆进入作业区域。

- When harmful gases present in pit, gas testing must be done before entry.

当坑体内可能存在有害气体时，作业前必须通过气体检测

- At night time and poor illumination area, warning lights should be prepared.

夜间没有进行作业且现场存在照明不良区域，应设立警示灯

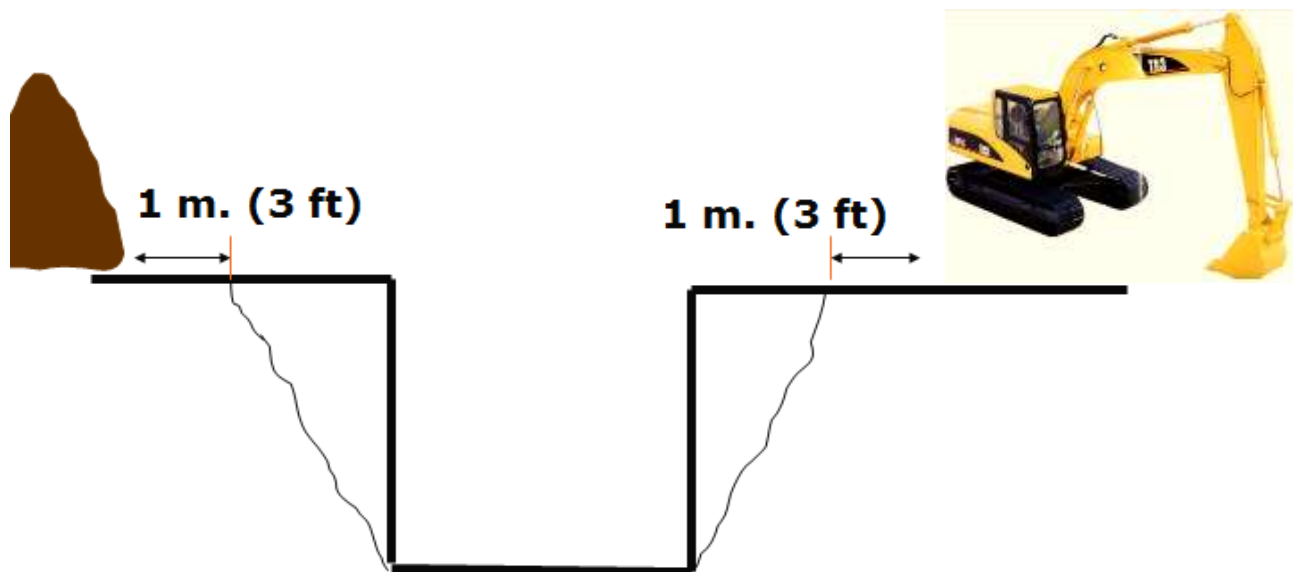


- Machinery and equipment in use should stay away from the edge of pit, and should be located on a solid foundation.

使用的机械设备应该远离坑体边缘，并位于稳固的地基上。

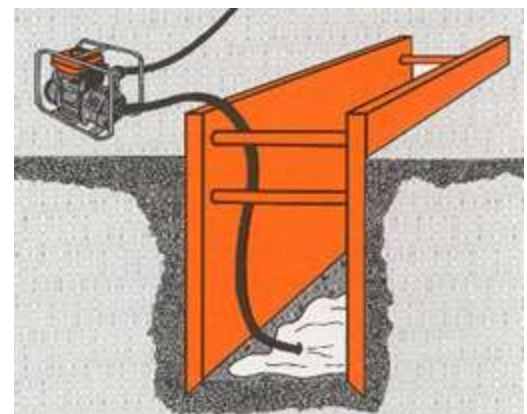
- Excavated soil should not be accumulated at the edge of pit or close to the excavation, piling up points should be more than 1.0 meter away from the pit, and the stack height should not exceed 1.5m.

挖掘出来的泥土不应堆积在挖掘体旁边，堆放点离挖掘体的距离应大于挖掘深度，至少超过 1 米，且堆积高度不得超过 1.5 米



**If pit depth exceed 1.2 m 当坑深超过 1.2 米时:**

- Set up the pit support or grading slop.  
必须安装支撑或放坡
- Never access into the pit without pit support or grading slop.  
禁止人员进入没有支撑或放坡的坑体
- To prevent pits collapsing, at sides and the end of the pits, set up guard or other support systems for





supporting.

为防止坑体坍塌，在坑体两侧和两端放坡时，应用护板或其它支撑系统进行支撑

- If involving water accumulation, drainage plan must be developed to prepare water pump or others pumping equipment.

如涉及可能积水的深基坑，必须制定排水方案，准备排水设备。

- Never dump mud into the rainwater or other sewage system.

禁止将泥浆排入区域内的雨水及其他污水系统。

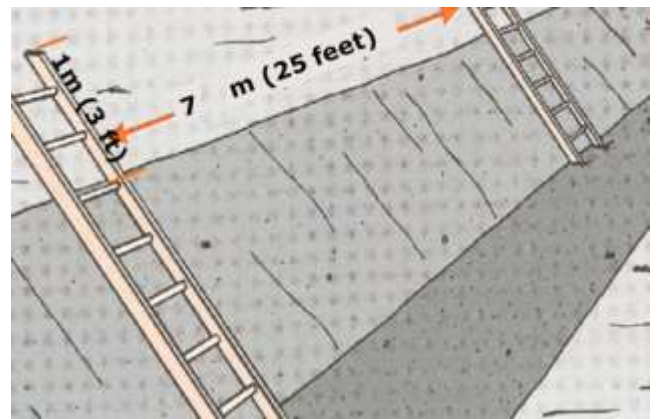
### **Access in pit 基坑通道：**

- Provide entry / exit ladders or other appropriate safety access.

提供进/出坑体的适当的梯子或其它安全通道。

- If the body length of pit is equal to or less than 7 meters, it should have two exits inside at least. If more than 7 meters, set an exit every 7 meters at least.

坑体长度如等于或小于 7 米，则内必须至少有两个出口；当超过 7 米时，应至少每 3 米设置一出口。



## 14. Work at Height

### 高空作业

#### (1) Definition of work at height 高空作业定义:

It applies for any activity where work is performed at height, 2 meters (6 ft) and above.

凡在坠落高度基准面 2m 以上(含 2m)有可能坠落的高空作业。

- **General working at height**

一般高空作业高度:

$$2\text{m} \leq H < 6\text{m}。$$

- **High risk working at height**

高风险高空作业高度:

$$H \geq 6\text{m}(\text{含 } 6\text{m})$$

#### (2) General rules for work at height

##### 高空作业的基本原则

- Working at height must have a specific safety plan, including falling rescue plan.  
高空作业必须有专项安全方案，包括坠落应急救援方案；
- High risk working at height **6m**, the whole operation must be under constant surveillance by safety watcher.  
超过 6 米的高空作业，必须在安全监督员全程监督下方可进行；
- Work at height operator must pass a medical examination. Anyone suffering from hypertension, heart disease, epilepsy, anemia and having fever, should not engage in working at height.  
高空作业人员必须经过体检，且患有高血压、心脏病、癫痫症、贫血症及感冒发烧等均不得从事高空作业；
- Work at height operator must get the working at height training.  
高空作业人员必须通过高空作业培训；
- Before working, tool box meeting should be held to discuss work related risks and safety measure.

高空作业前必须通过班前会议沟通工作风险及预防措施。

### (3) Priority for work at height plan selection

高空作业防护的方案选用的优先次序是

- Avoid working at height (such as: assembly, paint, operation on the ground etc.)  
避免高空作业（如在地面上组装、油漆，站在地面上作业等）；
- Use temporary working platform (such as lifting machine, movable or fixed scaffolding etc.)  
搭建临时的作业平台（如升降机、移动或固定脚手架等）；
- Segregation (temporary railing, fence, cover or safety net etc.)  
隔离（临时栏杆、四周围栏、护盖或安全网覆盖等）；
- Falling protection system (circumscribe operation within designated area, falling prevention system)  
坠落禁止系统（用安全警示带限制活动范围，预防坠落）；
- Falling arrest system (lifeline, hanging safety belt, lay a safety net for falling protection)  
坠落防护系统（安装生命线、挂安全带、铺设安全网等，在坠落时加以保护）。

### (4) General safety requirement for working at height 高空作业一般要求

- Operator must be fully protected by falling prevention system. If use double hooks and full body harness, when you need to change the anchor point, please always keep one hook is fixed on the anchor point or lifeline.  
高空作业时，必须全程受到防坠保护；如果使用双钩防坠带，需要换挂点而移动时，必须始终保持最少有一个钩固定在锚定点上；
- Never dial or pick up phone call, or listen music when working at height.  
禁止接打电话、听音乐等不安全行为；
- Tools, materials must use special packaging for storage or fixed.  
工具、材料等必须使用专用包装进行收纳或固定；



- Materials shouldn't be stacked to block passageway, and should be kept neat and order.

高空作业中所用的物料均应堆放平稳不妨碍通行；

- After working, tools, remaining material and waste should be cleaned away in time, never disorderly store material, and throw down tools or material.

使用后的工具、物件、余料和废料均应及时清理运走，不得任意乱置，禁止向下抛掷；

- Must clean all accumulated water at working area before working.

作业前，高空作业区域必须清除容易导致滑倒的积水等；

- Must barricade the ground areas having falling risk.

高空作业时，必须隔离有坠物危险的地面区域；

#### (5) Working at outdoor height 户外高空作业

- Must fixed loose objects and tools to prevent scattering or falling.

户外高空作业，必须固定松散的物件和工具，防止风吹散落；

- Never work at night or poor illumination situation.

禁止在夜间或光线不足的地方进行高空作业；

- When the wind force scale is greater than grade 6 (Beaufort scale: 10.8m/s to 13.8m/s), stop working at outdoor.

风力六级以及大于六级时，禁止户外高空作业；

- Never do outdoor operations in severe weather condition (heavy fog or rain).

恶劣天气(大雾天、雨天)天气禁止户外高空作业；

(6) Requirement for falling arrest equipment 高空作业的防护要求

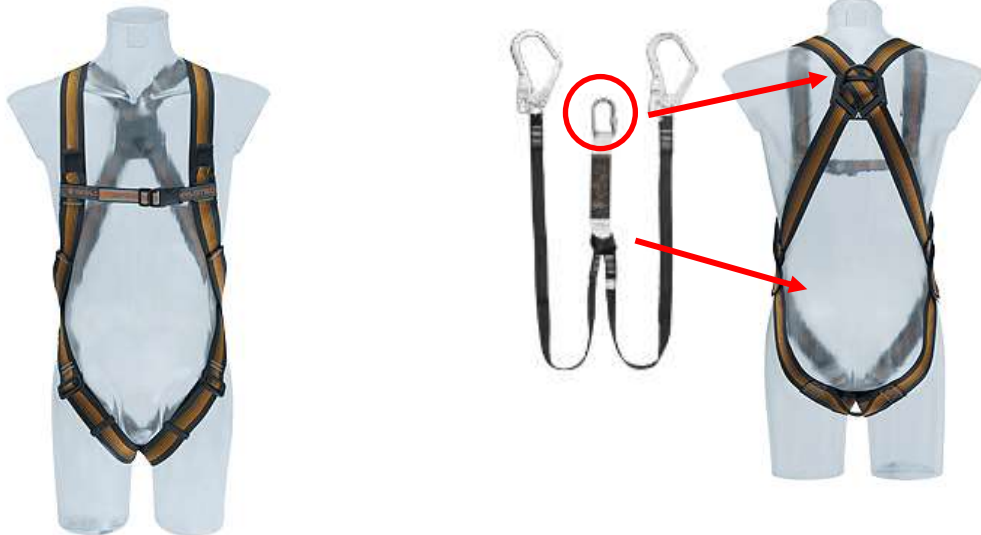
(a) full body harness 全身式安全带

Shock absorbing lanyards is fit for work at height that is higher than 6m.

缓冲双钩安全带用于 6 米及 6 米以上高空作业

$H \geq 6m$

Shock absorbing lanyards



Falling Arrest Blocks is fit for work at height that is between 2 and 6m.

自缩式防坠器用于 2 米及 2 米以上 6 米以下高空作业

$2m \leq H < 6m$

Fall Arrest Blocks



**Checking before using 防坠设备使用前检查:**



- Make sure the double hook is at good condition.

检查双钩闭合是否正常



- Make sure all accessories are at good condition.

检查安全带配件功能及状态是否正常



**(6) Requirement for checking lanyards 安全带使用要求:**

- If you discover the lanyard having absorbed forces by stretching, stop using it.  
如果发现装备曾受到过坠落负荷，应该立即停止使用它。
- Never do self-hook or hook each other, to prevent hook deformed or warped to causing hook opening by forces.  
安全带任何时候都禁止自扣，禁止双钩互扣，防止挂钩受力后变形脱钩；
- Always hang hook over the higher position. Anchor point must be engineered to resist a dynamic force of 2300Kg or 5000 pounds.  
安全带必须高挂低用，挂点必须有足够的强度，至少保证 100 公斤 2.0 米高处落物（2300Kg 或 5000 磅拉力），挂点不损坏或变形；

- Never keep hooks close to any sharp edges.

双钩锚定点的选择要避免任何锋利边缘；

- Never use the shock absorbing lanyard and self-retracting fall limiter simultaneously. When using self-retracting fall limiter, the karabiner should fix on the “D” ring.

禁止将自缩式防坠器与双钩缓冲安全绳串联使用，  
应将防坠器的钢钩直接扣在安全带背部 D 环上；

- Never use safety belt for binding or lifting.

禁止将安全带用于捆绑或起重物品；

- Safety belt must be in line with National or Global industrial standards with certificate.

安全带必须符合国家标准要求，具有检验合格证；

- We should select one representative sample of safety belt and sent to professional testing institutions to testing belts quality every two years, and file testing report.

安全带使用两年后必须抽样报送专业机构检验，并保存检验报告；

- Before using, if discover any defects with falling arrest equipment, report to on duty supervisor and stop using.

安全带每次使用前都应当检查，发现缺陷，应当立即报告或报废；

- The safety belt should be stored in a dry ventilated place, and prevent blazing sun, rain, any hot surface, flame, and sharp object.

安全带应当悬挂储存在干燥、通风的地方，防止日晒、雨淋，禁止接触高温、明火、强酸和尖锐的坚硬物体。

## (7) lifeline 生命线

- Lifeline should have the special design plan.

生命线的设置必须有安全专项设计方案；

- Lifeline should be wire rope, and made by qualified manufacturer, with product certificate.

生命线必须是钢丝绳，且由有资质的生产商生产，具备产品合格证；





- The minimum requirements for lifeline diameter should be equal to 12mm, and it should be selected larger type according to actual situation, if the distance is longer than 6m.

生命线直径的最低要求：直径 12mm, 如果跨度大于 6 米，还需要就具体情况选择大直径的生命线；



- Temporary lifeline, fixing end must use shackle connection. When using shackle connection, please refer to the below table, and ensure the connection strength should not be less than 85% of the breaking forces of wire rope.

临时安装生命线时，端部固定必须使用绳卡连接的方式，用绳卡连接时，应满足下表的要求，同时应保证连接强度不得小于钢丝绳破断拉力的 85%；

钢丝绳直径 (mm)	7~16	19~27	28~37	38~45
绳卡数量 (个)	3	4	5	6

绳卡压板应在钢丝绳长头一边；绳卡间距不应小于钢丝绳直径的 6 倍



- (a) Never use the knotted and fixed binding method for wire connection.

禁止使用打结的方式固定生命线；

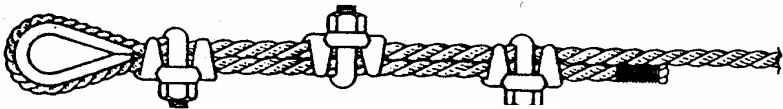
- (b) Lifeline inspection and invalidation standards refer to the safety of hoisting machinery safety regulation.

生命线钢丝绳的检查和报废标准请参考起重机械安全规范。

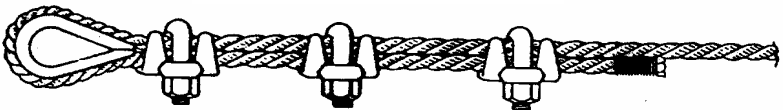




正确 correct



错误 wrong



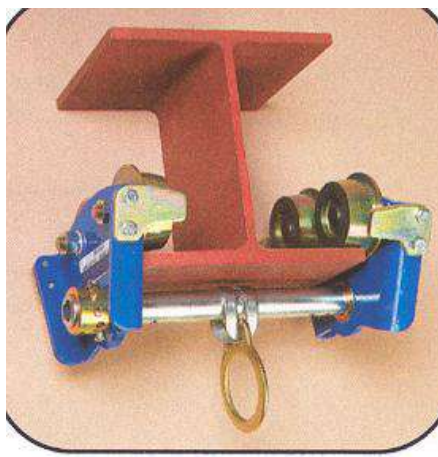
错误 wrong

Right connection method

正确的绳卡固定方式



Anchorage 锚定点:



## (8) Use lifting platform 升降机工作平台

### Before using 使用前

- The operator must check the electrical part at good condition. (Without damage or wear, power connection can match the power supply voltage and equipment), before start working.

操作人员必须检查电气部分状态正常（电源线无磨损，连接电源电压与设备相符等），确认完好后方可作业；

- Foundation support should be even and solid. Before use, first extends all legs, lift up machine, calibrate four feet level.

基础面必须水平、坚实；使用前，首先打开支脚，抬起整机，四只脚校正水平；

- When use lifting platform, barricade the falling risk area that is around the machines 2 meters away.

升降机工作时，四周 2 米之内禁止站人，以防落物伤人；

- Before using, test lifting machine with no-load, check the hydraulic system and make sure it is at good condition, and then start to load.

使用前先作空载升降，检查液压系统正常后才能载负荷使用；

- Pay more attention on the safety rated loads, never over-loading.

注意设备安全工作载荷，禁止超载；

### During working 工作期间：

- When working on lifting platform, never have violent shaking.

禁止人为剧烈摇晃；

- When lifting, operator must pay attention on the distance between the above object and lifting machine, avoid collision.

升降机起高时，操作人员必须注视与上方物体距离，避免起高碰撞；



- Operator working at lifting platform should wear safety harness.  
升降平台上方作业人员必须系安全带；
- When moving the lifting platform or machine, drop down the Crane Telescopic Jib to the minimum level.  
升降机移动时，必须将升降平台降至最低限度；
- When the wind force scale is greater than grade 6 (Beaufort scale: 10.8m/s to 13.8m/s), never working at outdoor.  
六级以上大风，严禁户外使用升降机作业；

## 15. Ladder Safety

### 梯子安全

#### (1) General requirement for ladder safety 梯子安全一般要求

- Go up or down ladder, always use handrail to make sure “three points contact”.

上下梯子时，保证手脚始终“三点”接触；

- Confront to the ladder and never hold objects when going up or down ladder, use tool bag to hold tools.

上下梯子时，必须面向梯子，禁止手持物件；

- Never allow two or more people stand on one ladder simultaneously.

禁止两个或两个以上的人同时攀爬一个梯子；

- Never use unfixed or un-extended ladders.

未固定的梯子不得用于作业；

- Ground support of the ladder should be solid and even, and never put ladder on any movable surface.

梯子底部应坚实，不得垫高使用；

- Never use ladder for braking, lifting, table, scaffolding, walkways and other improper purposes.

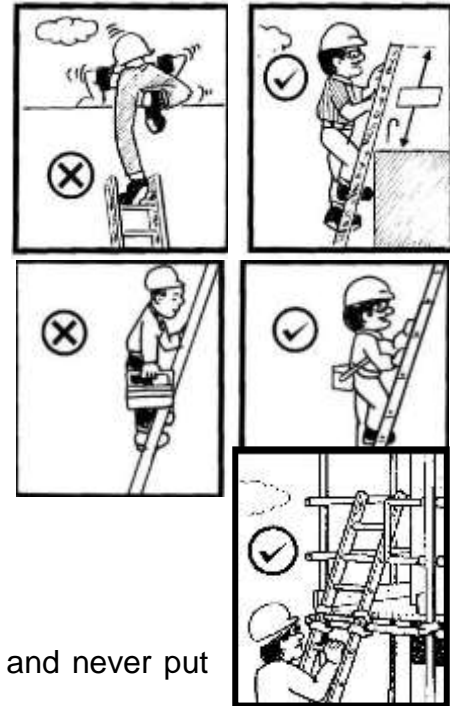
禁止把梯子用于制动、起重、工作台、脚手架、走道等用途；

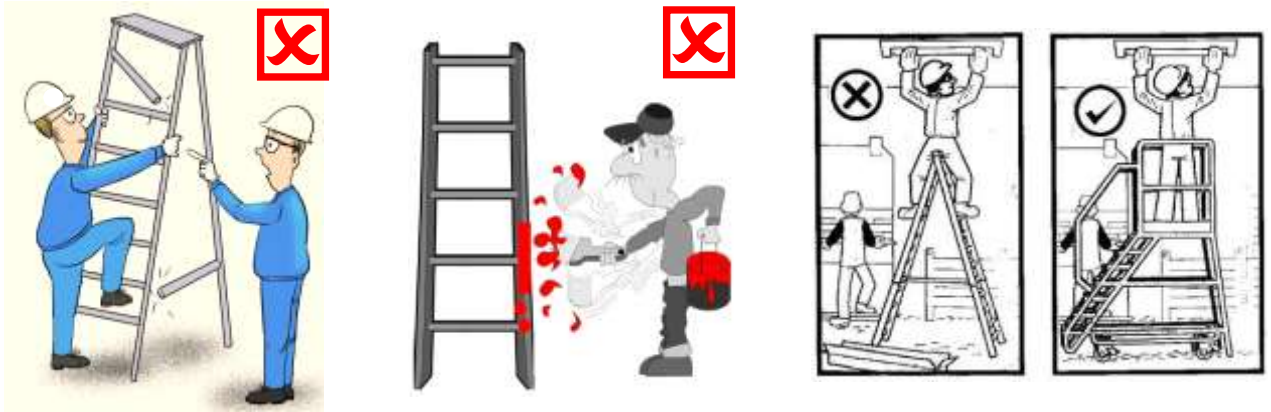
- Never use ladder without checked, or with defect. Never label or cover any defects on ladder.

使用前所有的梯子必须进行检查，有缺陷的梯子禁止使用，并加以标识或遮盖；

- Never use paint or any material to covers ladder or on its defects.

禁止使用油漆或者任何外包材料覆盖梯身损伤部位；





## (2) portable ladder 便携式梯子

- When doing welding or any works close to power lines or power control center, never use metal ladders.

在电焊或接近电线或动力控制中心时，禁止使用金属梯子；

- Never use the standing ladder, straight ladder, telescopic ladder, if the working position is higher than 5 meters, you must use the lifting platform or lifting trucks.

高度大于 5 米的，禁止使用人字梯、直梯、伸缩梯，必须使用升降平台或升降车；

- Use 1:4 proportions, horizontal versus vertical rules, to set up straight ladder.

应使用 1: 4 水平和垂直单元的规则来架设直梯；

- When using standing ladder, ladder must be fully open, and connected with fully stretched horizontal crossbar.

人字梯必须完全打开，连接横杆完全处于水平拉伸状态；

- Never use standing ladder for straight ladder purpose.

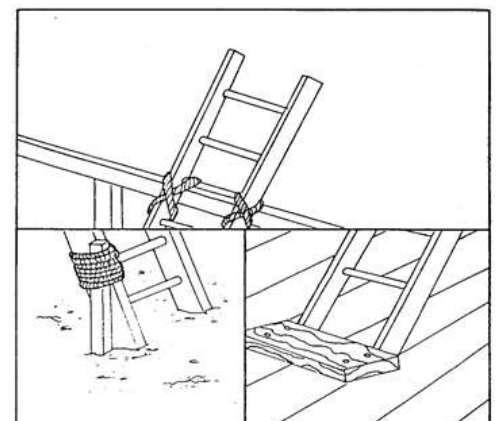
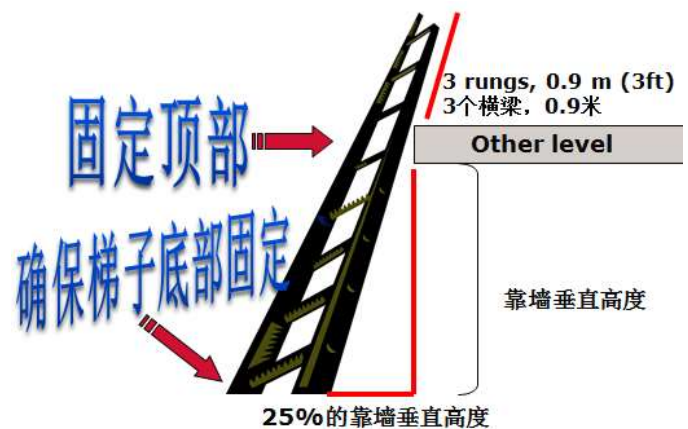
禁止将人字梯当直梯使用；

- Never use the top two steps of ladder.

禁止使用顶部两级；

- Never put tool on step of ladder.

禁止把工具材料放在踏步上。





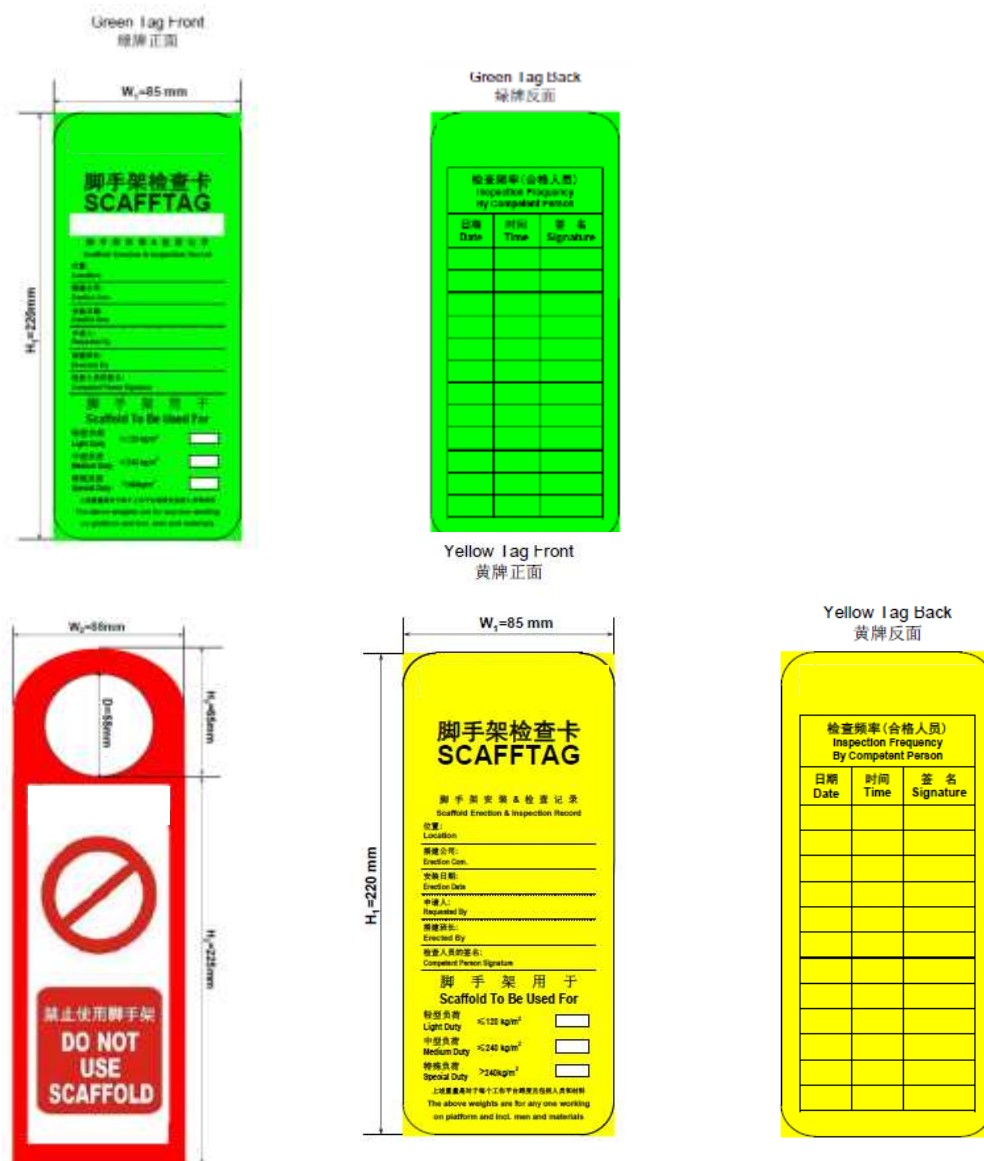
**(3) Telescopic ladder 伸缩梯:**

- Telescopic ladder needs 1.0 to 1.2 m overlap surface.  
伸展梯需要 1.0 到 1.2 米的交迭面；
- Adjust telescopic ladder on the ground. After adjusting, ensure effective lock and fix connecting rope. Never adjust the length when standing on the ladder.  
在梯子底部调整伸展梯，确保伸缩梯有效锁止，禁止在梯上调整，固定好连接绳；
- When extending telescopic ladder into another working surface, keep three steps over the horizontal surface at least.  
伸缩梯伸进入另一个水平面时，至少留出 3 个横梁超过水平面；



# 脚手架

禁止使用无脚手架绿色许可证。



- Operator engaging in scaffolding operation must have the scaffolding operation license.

从事脚手架施工的人员必须经考试合格，持证上岗；

- When moving scaffold, take care about the distance between the top of scaffold and building.

移动脚手架时，必须注意顶部间距；

- When working on scaffold, block all wheels of scaffold with brakes.

在移动式脚手架上作业时，必须将所有的轮子都已锁定；

- When moving scaffold, operator cannot stand on it.

移动脚手架时，禁止架上站人；

- When moving scaffold, all tools and materials must be removed from or fixed on working platform.

移动脚手架前，必须移走或固定平台上所有的工具和材料；

- Never climb out of the scaffolding fence.

禁止攀爬出脚手架围栏；

- When going up and down scaffolding, use the designated ladder.

上下脚手架时要使用梯子；



## (2) Requirement for scaffold setup 脚手架设置的要求

- If scaffold's altitude is higher than 6 meters, there must be a special erecting plan, and approved from site PROJECT SAFETY OFFICE.

高于 6 米的高空作业工程，脚手架必须有专项方案，并经过建设部审批；

- Without safety watcher approve, never change or remove any parts of the using scaffold.

未经安全监督员授权，禁止改变或移走使用中脚手架的任何部位；

- Fasteners or accessories should have certificate, any defective parts shall not be used.

扣件应有出厂合格证，脆裂变形滑丝不得使用；

- Never use bamboo scaffolding or single row of scaffolding.

禁止使用竹制脚手架，单排脚手架；



- Qualified wooden scaffolding or special skid metal scaffold boards can be used only.

允许使用合格的木制或者专用防滑金属脚手板；

- The scaffold boards should be 50 mm or more thick.

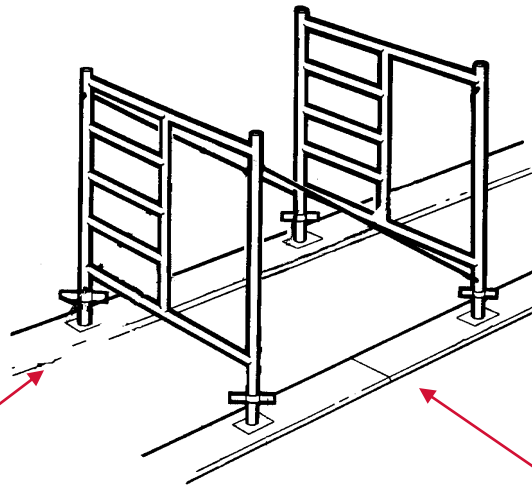
脚手板必须为厚度为 50 毫米的坚实材料；

- Never use welding, cutting, burning, punching or bending and other methods to change any parts of the scaffolding.

禁止通过焊接、切割、燃烧、打孔或弯管等方法改变脚手架的任何部件；

- Scaffolding must be built on a solid foundation and maintain all parts to be horizontal or vertical.

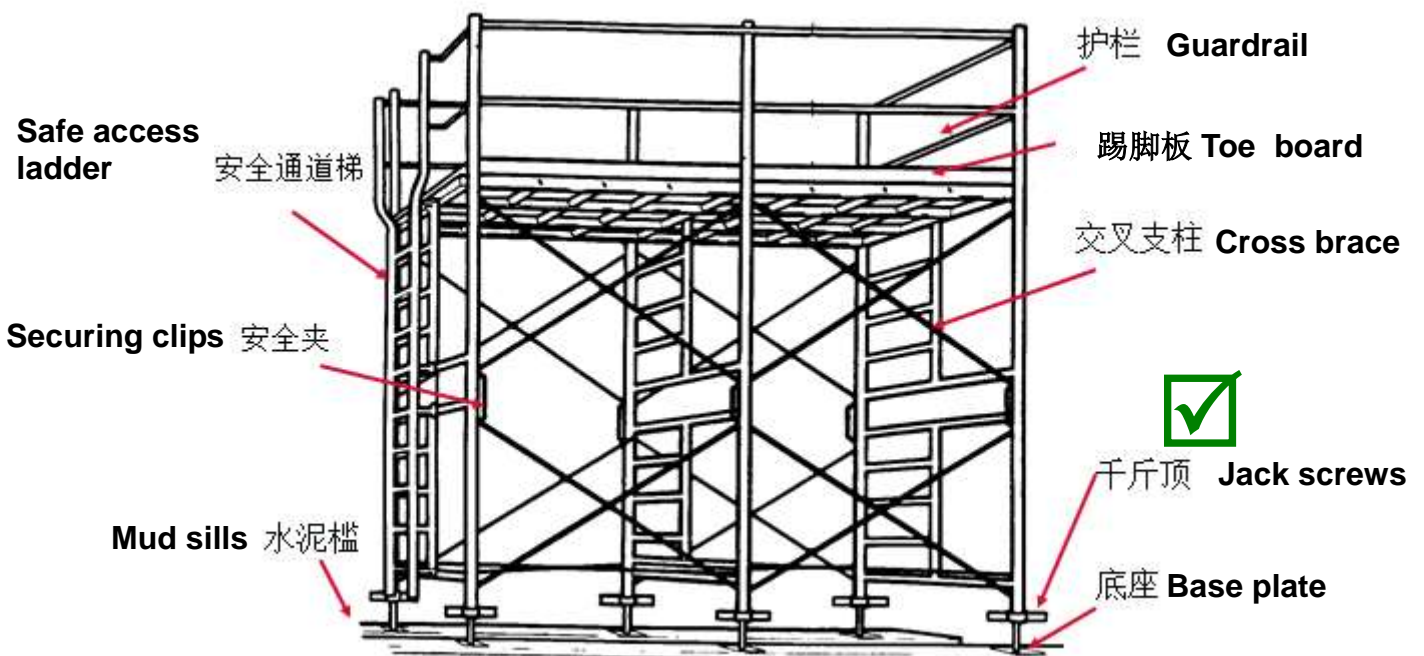
所有的脚手架必须搭建在牢固的地基上，保持水平和垂直；



Nail base plate to sill

将地盘钉在水泥槛上

Mud sill  
水泥槛



Safe access  
ladder

安全通道梯

Securing clips 安全夹

Mud sills 水泥槛

护栏 Guardrail

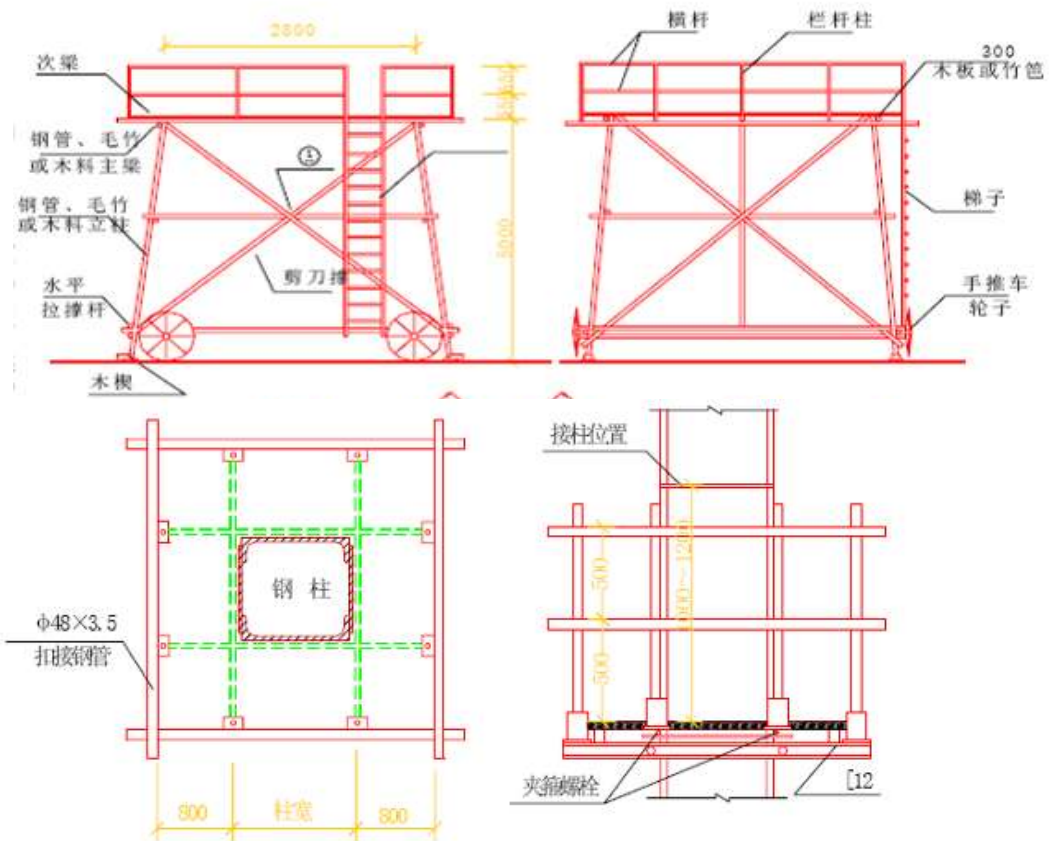
踢脚板 Toe board

交叉支柱 Cross brace

千斤顶 Jack screws

底座 Base plate

- All scaffolding must be equipped with a 1.2-meter-high fixed railing, 60 cm high intermediate rail, fixed good pedal (surrounded by 10 cm high toe board).  
所有的脚手架平台必须配有 1.2 米高固定好的围栏，60 厘米高的中间栏杆，固定好的踏板(四周有 10 厘米高的踢脚板)；
- Scaffolding loading weight can not exceed its safety rated loads.  
脚手架承受的重量不得超过脚手架的安全工作负荷；
- When the scaffold height is more than three times the size of its foundation, it must be fixed with other bracket. In the horizontal direction, every 6m and vertical direction every 4m should be fixed.  
当脚手架的高度超过根基尺寸 3 倍时，必须将其固定在其它的支架上。  
脚手架在水平方向上每隔 6 米, 垂直方向上每隔 4 米, 必须固定一次；
- Never use the adjusted or leveling screws for wheeled scaffolding. Adjusting screw bolt cannot exceed 30 cm longer than the nut.  
调节或水准测量螺丝禁止用于装有轮子的脚手架上，调节螺丝的螺纹不能超出螺母 30 厘米。



(1) 平面图

(2) 立面图

### (3) Requirement for full scaffolding 满堂脚手架的设置要求

- Setup scaffolding must have an effective erecting plan.  
脚手架搭设必须要有有效的专项施工方案进行搭设；
- Three-step construction boards should be set with the leading pole. Its height should be set with wooden board. The space of two step boards should not be less than 18cm. The step board should be 2cm thick wooden board, and equipped with 2,000 dense meshes.  
脚手架外立杆内侧随施工层次高度设置三步踢脚板，踢脚板的间距不得低于 18cm 、2cm 厚木板，然后张挂 2000 密目网；
- Full-house scaffolding erecting must be done in accordance with National Regulations.  
满堂脚手架搭设必须根据国家脚手架搭设规定进行。



### (4) Before using scaffold, these following items should be checked 使用脚手架前应注意

- Guardrail, baffle plates and step board must be the right place.  
围栏, 侧板或挡板以及踏板都已物归其位。
- All wheels of movable scaffolding must be locked.  
可移动脚手架上的所有轮子都已经锁定。
- All connections should be at good protection.  
连接处都已经被保护好。

- The Work Permit for scaffolding should be valid.  
脚手架许可是有效的。
- If the scaffolding without a guardrail or toe board, operator for erection must wear safety harness or fall protection equipment, and fix at right anchorage.  
如果操作平台没有设置围栏或踢脚板，必须佩戴安全带或者防坠护具，并锚定在平台上。

## 17. Temporary Power Supply

### 临时用电

#### (1) General requirement 一般安全要求

- Only qualified and trained electrician can handle electrical work, including installation, testing, inspection, and maintenance.

现场只有持证、并经过特别培训的电工才可以进行电气作业，包括安装、测试、检查和保养。

- Temporary power supply equipment should be daily inspected and recorded. Grounding resistance and insulation resistance should be monthly tested for its values.

临时用电须每日进行检查，检查要有记录；至少每月应当对临时用电测试接地电阻值和绝缘电阻值。

- Power Distribution Cabinet and Switch Box should be locked and controlled by designated personnel. The contacts name and contact way should be marked on the cabinet.

配电箱、开关箱平时必须加锁，由专人负责，姓名及联系方式标在每个配电箱上；

- Inspection, connection, maintenance, the upper level controller must be switched off and isolated by LOTO.

检查、连接、维修线路时，必须对上一级的电源开关进行断电隔离、挂牌上锁。

#### (2) Requirement for temporary power supply system

##### 临时用电系统的要求

- Overhead cables must be set up and supported by special poles, fixed with insulating objects. Don't try to keep cable underground if possible.

电缆干线应架空敷设，尽量不埋地敷设，架空线必须架设在专用电杆上，用绝缘物件固定。

- Never use tree, scaffold, and steel rack to be cable support.

禁止架设在树木、脚手架、钢构等设施上；

- If have to keep cable on the ground, use cable protection trough to cover on it.

如果必须铺设在地面，则必须使用电缆保护槽；

- Overhead cables should be labeled with warning signs to prevent the vehicle, other objects, or persons in contact.

架空线路必须有警告标示，防止车辆、其他物体或人员接触；

- Cables through the buildings, structures, roads, vulnerable places to mechanical damage must have the additional protective sleeves.

电缆穿越建筑物、构筑物、道路、易受机械损伤的场所，必须加设防护套管；

- Electrical equipment should not be overloaded.

电气设备不得超负荷工作；

- All cables must be insulated conductors, never be bare or aluminum type.

所有线路必须采用绝缘导线，不得采用裸露的或者铝质的线路；

- In distribution cabinet, switch cabinet, incoming and outgoing cables cannot withstand any external forces.

配电箱、开关箱的进线和出线不得承受外力；

- Distribution boxes around two meters range shall not be piling up debris, flammable and explosive materials, shall not be stored pollution sources and corrosive materials.

配电箱周围 2 米内不得堆放杂物，不得存放易燃易爆物、污源和腐蚀物品。



Refer to Shell Protection Grade GB4208-1993 Content:

根据外壳防护等级 GB4208-1993 内容:

表 1 IP 代码的组成及含义			
组 成	数字或字母	对设备防护的含义	对人员防护的含义
代码字母	IP	—	—
第一位 特征数字		防止固体异物进入	防止接近危险部件
	0	无防护	无防护
	1	$\geq \phi 50 \text{ mm}$	手 背
	2	$\geq \phi 12.5 \text{ mm}$	手 指
	3	$\geq \phi 2.5 \text{ mm}$	工 具
	4	$\geq \phi 1.0 \text{ mm}$	金属线
	5	防 尘	金属线
	6	尘 密	金属线
第二位 特征数字		防止进水造成有害影响	
	0	无防护	
	1	垂直滴水	
	2	15°滴水	
	3	淋 水	
	4	溅 水	—
	5	喷 水	
	6	猛烈喷水	
	7	短时间浸水	
	8	连续浸水	



## 18. Portable and Electrical Tools

### 手动及电动工具

#### (1) Portable tool 手动工具



- Any portable tools with sharp edges must get project safety office approval before using in GTIIT.

项目内带锋边的手动工具必须通过项目安全办公室批准才能投入使用；

- All approved tools can be approved within site approval tool list.

所有批准的利器等工具列表在项目内批准工具列表内可以查询；

- Never use homemade tool.

禁止使用一切自制的工具；

#### **Requirement for knife 对于刀具的使用：**

- Never use home-made knife and utility knife.

项目内禁止使用美工刀或者自制的刀具；

- All knives should be approved for specified working positions. Never use unapproved knives in Project.

所有刀具均针对相应岗位经过测试和批准，任何未经许可的刀具禁止在项目内使用；

- When using knives, the user must use designated cut-resistant gloves simultaneously.

使用刀具时，必须配合指定的防割手套同时使用；

#### **Requirement for hammer 铁锤：**

- When wooden handle of hammer is damaged or loose, must be fixed or stop using immediately.

木柄一旦破损或者松动，必须及时固定或停止使用；

- When using hammer, the user cannot stand in the range of hammer's movement orbits.

铁锤的使用时，人员必须站立在铁锤的运动范围之外；

## **(2) Electrical Tool 电动工具**

**Classification of Electrical Tool 工具接触电保护分为：**

### **Class I**

#### **I 类工具**

Tools in protection against electric shock do not rely on basic insulation but also include an additional safety precaution.

工具在防止触电的保护方面不仅依靠基本绝缘，而且它还包含一个附加的安全预防措施。

### **Class II**

#### **II类工具**

Tools in protection against electric shock do not only rely on basic insulation but also provides double insulation or reinforced insulation without other additional safety precautions and protective earthing.

Class II tools include insulation shell cover type and metal cover type. The visibous sign of tool is marked with Class II symbol "回".

工具在防止触电的保护方面不仅依靠基本绝缘，而且它还提供双重绝缘或加强绝缘的附加安全预防措施，没有保护接地或依赖安装条件的措施；

II类工具分绝缘外壳II类工具和金属外壳II类工具，在工具的明显部位标有II类结构符号“回”。

### **Class III**

#### **III类工具**

Tools in protection against electric shock rely on the safety extra-low voltage power supply and they cannot generate high voltage than the safety extra low voltage.

工具在防止触电的保护方面依靠由安全特低电压供电和在工具内部不会产生比安全特低电压高的电压。

**General Requirement 一般要求：**

- Portable tools used in project must comply with the appropriate industrial standards.

施工中使用的手动工具必须符合相应的工业标准；

- Before using electrical equipment, all portable tools must be checked and labeled by qualified electrician, and regularly maintained and kept maintenance records.

现场一切电动设备进入现场前必须由合格的电工进行检验、标签，并有专人负责进行定期保养维护，并保存保养记录；

- If you use class I tools, the rated leakage current should be less than 30 mA, the action time of leakage protection appliances should be less than 0.1 seconds, such as electric leakage protection circuit, safety isolation transformers, etc.

Insulated gloves and shoes should be worn, or standing on insulating mat.

如使用 I 类工具，必须要求装配额定漏电动作电流不大于 30 毫安、动作时间不大于 0.1 秒的漏电保护电器，如漏电保护电器，安全隔离变压器等；

使用者必须佩戴绝缘手套，穿绝缘鞋或站在绝缘垫上；

- In high humid or good conductive property area and workplaces, you must use the Class II or III type.

在潮湿的场所等导电性能良好的作业场所，必须使用 II 类或 III 类工具；

- In special circumstances, such as heat and wet or explosive or corrosive gas environment, the using tools must comply with appropriate protection requirements.

在特殊环境如湿热及存在爆炸性或腐蚀性气体的场所，使用的工具必须符合相应的防护等级的安全技术要求；

- Never use defective tool.

禁止有缺陷的设备入场；

- Flexible cable should not be replaced to take longer without design or planned.

工具的软电缆或软线，禁止任意接长或拆换；

- All temporary cables, tow lines and portable power tools must be equipped by electricity leakage protection.



现场所有临时电缆，拖线和便携式用电工具必须有漏电保护器保护；

- Tools' protective earthing resistance value must be less than 4 ohms.

工具的保护接地电阻值必须 $\leq 4$  欧姆；

- The insulation resistance of long-term spare tools must be checked before using.

长期搁置不用的工具，在使用前必须检测绝缘电阻是否正常；

- Only authorized staff can disassemble and repair tools.

非专职人员禁止擅自拆卸和修理工具；

- Tools must be installed safety mechanical protection devices according to the relevant standards (such as protective cover, protective cover, etc.). Never disassemble without permit.

工具必须按有关的标准装设机械防护装置(如防护罩、保护盖等)，禁止任意拆除；

- When maintaining equipment, never remove, exchange or missing the insulated cover within the tool.

维修时，工具内的绝缘衬垫、套管等禁止任意拆除、调换或漏装；

- After repairing tools electrically insulating part, measurement and test must be carried out. If the tool cannot be repaired, it must be scrapped.

工具的电气绝缘部分经修理后，必须进行下列测量和试验，工具如果不能修复，必须报废；

- If tool's insulation part is damaged, sheathed flexible cable or casing rupture, protective grounding or zero line off, plug socket cracked or any other unsafe condition occurs, the problem must be got rid of immediately. Never use defective tools.

工具如有绝缘损坏、软电缆或软线护套破裂、保护接地或接零线脱落、插头插座裂开或有安全隐患时，必须立即进行修理,在未修复前，禁止继续使用；

- Never change the tool's original design parameters without any design plan. Never use materials with lower performance or alternative materials and components are inconsistent with the original specification.

禁止任意改变工具的原设计参数，禁止采用低于原用材料性能的代替材料和与原有规格不符的零部件。

### **Electric drill 电钻**

- When using drill, grasp the drill handle firmly.  
作业时应掌握电钻手柄。
- In order to prevent motor overload, never provide forced with additional pressurized bar.  
防止电机过载，禁止用力棒加压；
- Drill should be 40% intermittent running, never use for continuous running purpose.  
电钻为 40%断续工作制，禁止长时间连续使用。



### **Angle-grinder 角磨机**

- Pad between the grinding wheel and clamp access should be firmly installed. Never over-tighten the bolt.  
砂轮和接盘间软垫应安装牢固，禁止螺栓过拧；
- Never use wheel with damp, deformed, cracked, broken, chipped edge notch or exposure to oil.  
禁止使用受潮、变形、裂纹、破碎、磕边缺口或接触油碱类的砂轮；
- Never use the damp grinding wheel by drying.  
禁止将受潮的砂轮片自行烘干后使用；
- Wheel's rated speed must be greater than the rated speed of the angle grinder.  
砂轮片的额定速度必须大于机具的额定速度；
- When discovering the cutting or grinding wheel with blunt or damaged, you must stop and replaced a good one.  
发现刀具和砂轮有磨钝，破损时，必须停机更换，更换后方可继续使用。



## 19. Loading and Unloading

### 项目内装卸货

1. The transportation vehicle must comply with relevant National regulations. Truck drivers must have "two licenses and one insurance policy" that includes driver's license, vehicle registration certificate and compulsory insurance for transportation vehicle.  
车辆必须符合国家有关规定，装运一般货物的车辆及驾驶人员必须具备“两证一险”，即汽车驾驶证、车辆行驶证和交强险；
2. The transportation vehicle's loading weight cannot exceed truck's rated loading weight.  
运输车辆装载重量不得超过额定重量；
3. Operator handling loading or unloading must get the specialized safety training.  
装卸人员必须经过专门的安全培训；
4. Before loading, warehouse caretaker must follow these below actions.  
卸货前，仓库管理员必须确保：

- Before loading and unloading, vehicles' drivers must follow the guiding from warehouse caretaker to park at the designated position.

装卸货前，车辆必须听从现场人员指引，停靠在指定位置内；

- After the truck stop and park at designated position, ask driver turn off the engine, and then prepare to load cargo.

在车辆完全停稳，关闭发动机后，再开始准备卸货；

- In order to prevent the vehicle sliding during parking, pull the handbrake, braking tyres should be blocked by triangular block chock.

启动车辆刹车装置(拉手刹)，制动胎下固定好三角挡块，以防止车辆在停车期间滑动；



#### Van vehicle 厢式车:

Before loading 卸货前:

- Firstly, open the door to observe with small gap whether goods are dumping, leakage, and abnormal odorant or not.

应先小角度打开箱门，观察是否货物有倾倒、泄漏现象，及异常气味；



- Ensure drum or package is not at the risk of loose, or collapse, and then can start unloading.

必须在确保铁桶无松散、坍塌可能时，方允许卸货；

- After confirming no abnormal situation, carefully open the container doors. When opening door, never stand in front of the container doors to prevent unstable cargo slipping and hitting.

确认无异常情况后，小心打开集装箱门，避免站在集装箱门的前方，以防不稳定的装载货物滑落；

### **Inventory 货物入库：**

1. When unloading and unloading, the warehouse caretaker must check all documents based on delivery order or bill of lading & packing list etc.

The checking items:

在卸货前和卸货过程中，仓库必须根据提单&装箱单或者送货单检查核对以下项目，以确保送货准确：

2. In order to ensure adequate fire protection fire spacing, the distance between stacking and warehouse walls should not be less than 50cm.

货物距离仓库墙壁和不同堆垛间距离不得少于 50cm, 以确保有充足的防火消防间距.

3. Never piled up goods in front of fire-fighting equipment, never impede the fire fighting equipment access.

禁止将货物堆放在消防设备前方，妨碍消防设备的获取。

## 20. Transportation Safety

### 车辆安全

The vehicle driver must comply with National and Project Transportation Safety Rule, take training and have driving license.

车辆的操作人员必须遵守国家以及现场的交通规则，受过车辆驾驶培训并取得资格证书的人员进行车辆驾驶。

All vehicles in project must follow site safety driving requirement.

入场车辆必须按项目内车辆行驶要求安全行驶。

#### (1) Requirements for drivers and passengers 对驾驶和乘坐车辆人员的要求

- Before using, do the routine check.  
使用前必须进行车辆日常检查；
- Never drive in severe weather.  
禁止在天气恶劣的情况下驾驶车辆；
- Never drink any alcoholic beverage before driving or on the road.  
禁止在行驶前或途中饮用带酒精类饮品；
- Driver must be responsible for the stability of shipping materials.  
驾驶员必须对其装运材料的稳定性负责；
- Company cars must be parked in designated parking lot.  
项目内车辆必须在指定位置停放；
- When start engine, never work under the car.  
当车辆启动时，禁止在车底下进行任何作业；
- When driving, never pick up mobile phone.  
行车时，禁止使用手机；
- Never allow mixed loading (people and goods) in truck.  
禁止人员乘坐在自卸货车车厢内，人货混载；
- When parking for loading or unloading, never block the main avenue.  
停车卸货时，禁止将车辆堵塞在主要交通通道上；

- When barricading way for loading and unloading, if there are any trucks or cars need to pass the blocked area, the driver must communicate with the person in charge of this area and let him release the barricade before passing.

经过已经隔离的装卸货区域时，必须停止并和装卸货负责人沟通，协调后方可通过。

- When loading or unloading, truck driver must leave from the driver cabinet to the guard room.

在装卸货过程中，货车驾驶员必须离开货车驾驶室到保安室休息；

- When driver leave from truck, he must turn off the engine and pull the handbrake.

司机离车时，必须将车辆熄火，并挂档、拉紧手制动器；

- If driver need to support at loading or unloading area, he must be equipped with PPE according to working position requirement.

货运司机在卸货区域内，必须按现场规定配备个人防护用品，禁止私自走动；

- After completing loading or unloading, the driver should not wander in GTIIT.

卸货完毕后，迅速将车辆驶离工地；

## **(2) Driving requirement in project site 项目内行车要求**

- In outer loop avenue, truck speed cannot exceed 15km per hour.

项目内的外循环车道，速度禁止超过 15km/h；

- At loading, unloading area and turning area, the speed limit cannot exceed 10km per hour.

装卸货区域及转弯区域，车速禁止超过 10km/h；

- All vehicles of GTIIT must be equipped with seat belts.

车辆内所有座位必须配备安全带；

- Never use truck designed for cargo loading to use for persons sitting purpose, never installation of seats by modification.

非设计用于载人的车辆，禁止载人、私自加装座位；

- Trucks and trailers must be set independently moving and braking device.

车辆及挂车必须设置独立的行车和驻车制动装置；

- Ensure the brake system is at good condition and effective when moving.  
确保制动装置在车辆行驶时，性能良好、有效；
- If truck and trailer accidentally decouple, the trailer should be able to self-braking, and the truck brake should be still valid.  
挂车与牵引车意外脱钩时，挂车必须能自行制动，而牵引车的制动仍然有效；
- Vehicles must be equipped with reversing alarms. If there is not reversing alarms, when reversing the truck, there must be a co-drive operator for guiding or honking for warning.  
车辆必须配备倒车警报；如果没有倒车警报，则车辆倒车时必须有一名指挥或驾驶员须鸣喇叭；
- In heavy traffic areas, there must be a full-time staff responsible for directing the reversing move.  
在交通拥挤的地方必须有专职人员负责指挥倒车；
- If on-site emergency occurs, truck drivers must move the truck away from the main avenue, and then turn off the engine, evacuate to muster point, leaving the keys in case need to move the vehicle.  
如果现场紧急情况发生，车辆必须撤离车道，关闭发动机，步行到集合区域，留下钥匙以防万一要移动车辆。

## 21. Forktruck safety

### 叉车安全

#### (1) General Requirement for Forktruck 叉车一般要求

- Forklift must be tested by authorized party, and have the operation license issued by Gov.

叉车必须经过检验，并具有合格的使用登记证；

- The forklift driver must have the valid forklift driving license.

操作人员必须具备叉车操作资质，并在有效期内；

- Necessary safety devices of forklift

叉车必备的安全装置：

##### (1) Steel skeleton above the driver seat

司机安全顶部保险架

##### (2) Steel fence

货物靠骨架

##### (3) Steel skeleton in front of driver seat

前视挡板

##### (4) Horn

喇叭

##### (5) Head light and rear light

前后灯

##### (6) Turning light

转向灯

##### (7) Rearview mirror

后视镜



Before using forklift, daily check should be done.

每日出车前，应做好车辆检查。

#### (2) Requirement for forklift operation 叉车操作要求

- When starting operation, forklift driver should make sure the cargo stable and reliable, and then start slowly and steady.

叉车在载物起步时，驾驶员应先确认所载货物平稳可靠，起步时须缓慢平稳起步；

- Forklift speed cannot exceed the speed limit: 5km per hour.

叉车项目内行驶速度最大不得大于 5km/h；

- When running without loads, keep forks away from the ground 50-150 mm.

空载时，货叉距地面 50-150 毫米；

- When running with loads, the bottom of pallet shall not be higher than 500 mm above the ground.

载货行驶时，货件离地高度不得大于 500 毫米；

- Never over-loading, or deviate the gravity center of cargo from the center of two forks.

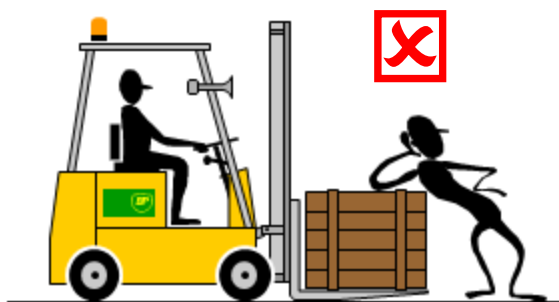
严禁超载、偏载行驶；

- Whenever running or non-running, never allow people standing on or under forks or cargo.

叉车在运行时，禁止任何人上下车，货叉上严禁站人；

- Never cross over any hoses or power cables.

禁止碾压软管或者电线；

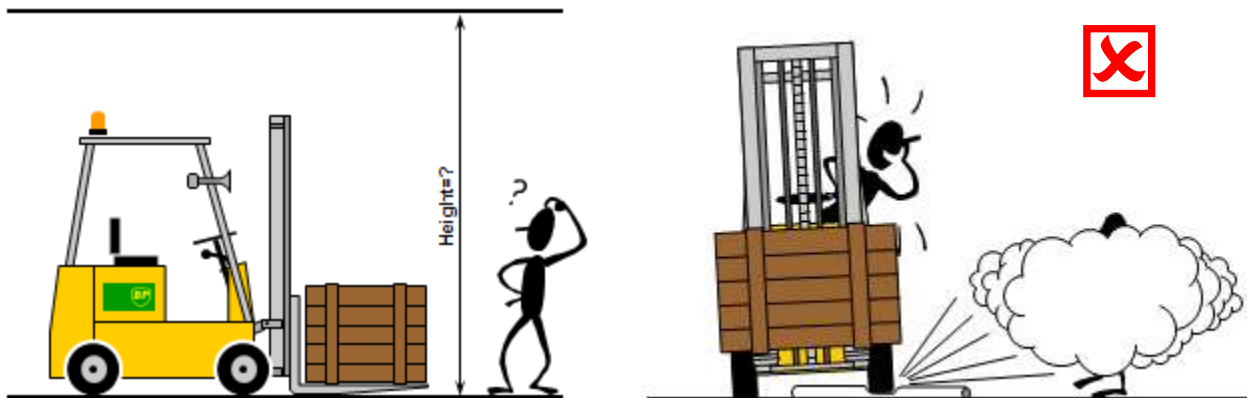


- When lifting forks, never allow personnel activities within the radius of forklift's operation.

货叉升降时，活动半径内禁止人员活动；



- When accessing into or out of workplace, the height limit should be aware.  
进出作业场所，应注意门限高高度；



- When accessing into workshop or driving on the way, ensure whether there is any obstacles on the top of passageway or not.  
进出作业现场或行驶途中，要注意上空有无障碍物刮撞；
- When crossing corners, forklift driver must blow horn. If someone is walking ahead, forklift driver must honk to prompt the driving directions.  
或经过拐弯处，必须鸣笛；前方有人，应当按喇叭提示行车路线；
- When crossing corners, forklift must slow down.  
经过拐弯处必须减速行驶；

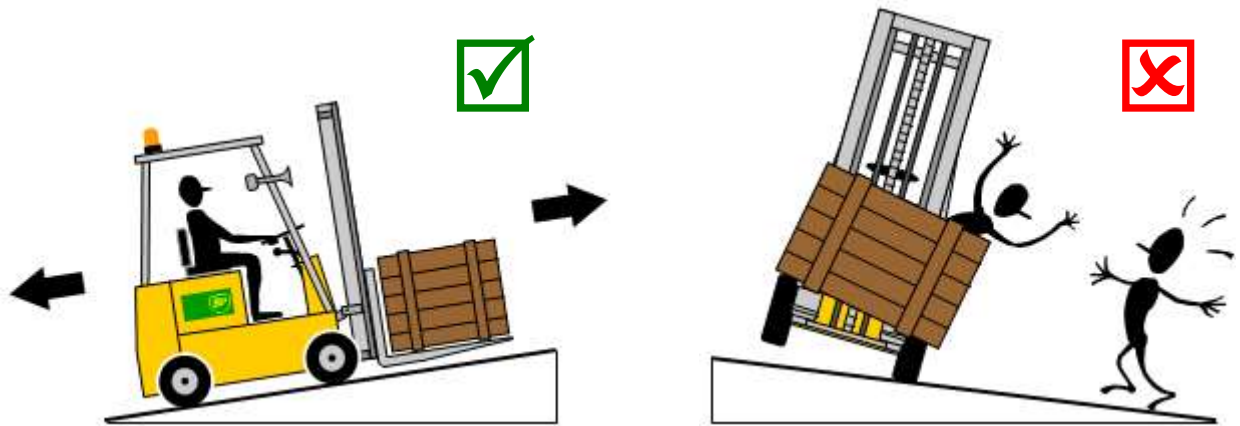


- When doing normal operation, never have sharp turns and brakes.  
非紧急情况下，禁止急转弯和急刹车；
- When going up or down slope: when running at slop without loads, forklift driver needs to go backwards uphill, moving with forks forward downhill. So the gravity center will fall on the front wheels.  
空车上下斜坡：在斜坡上空车行驶，需要倒退上坡，货叉向前行驶下坡。

这样重心会落在前轮上；

- When loading ramp down: the need to move the forks, exercised uphill, downhill running backwards, so the focus will fall on the front wheels.

载货时上下斜坡：需要货叉向前，行使上坡，倒退行驶下坡，这样重心也会落在前轮上；



- Never turn on slope.

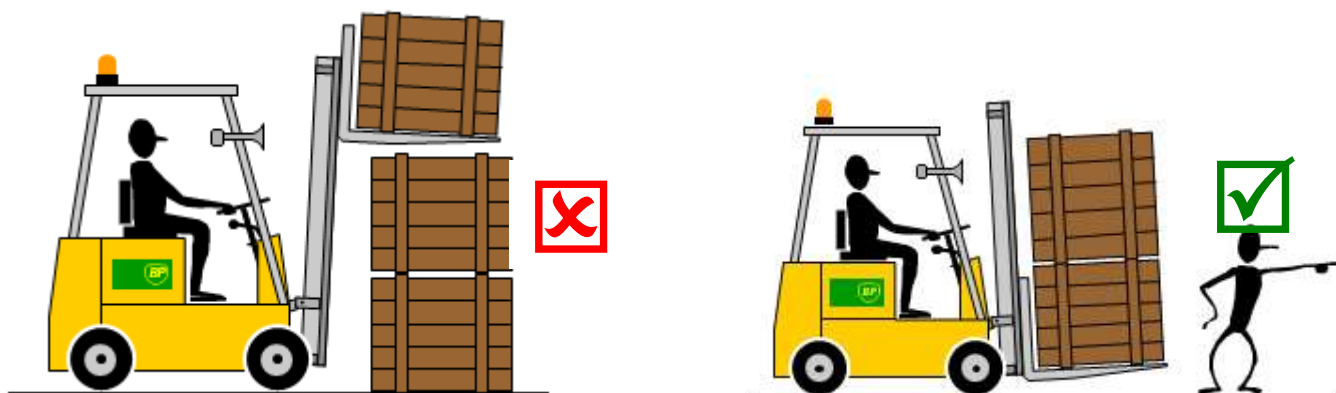
禁止在斜坡上掉头或转向；

- Before loading and unloading, it is time that starts loading or bearing forks to keep stable, brake the forklift, and vice versa.

装卸货物时，即货叉开始承重至承重平稳以及相反的过程期间，必须刹车；

- When putting goods up and down shelves, never keep forks forward to unload cargoes.

货物上下货架时，禁止叉齿前倾卸货；

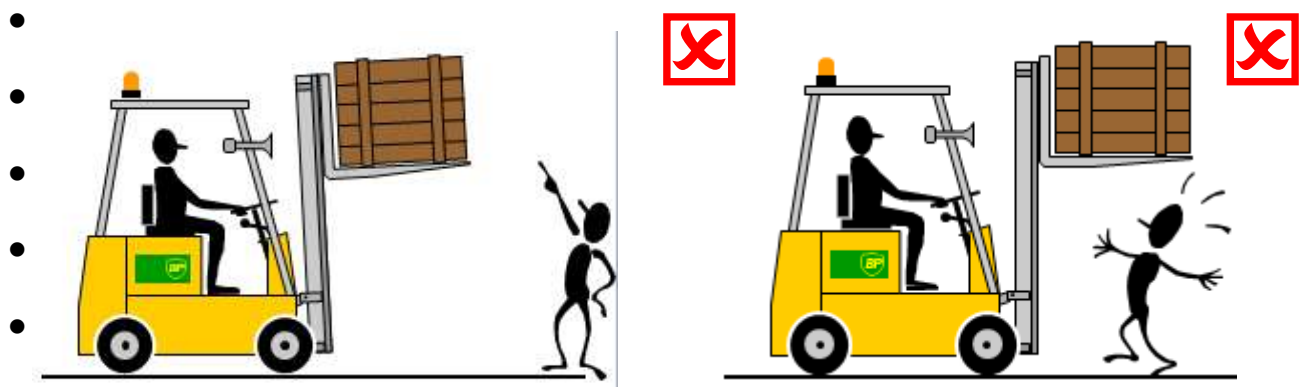


- Never block forklift drivers' view. If the driver's view is blocked by goods, he must need to reverse the forklift, or carried by beside guider. But the guider cannot stand on the truck's moving route; he must be in the visible range of forklift driver's side.

禁止载物阻挡司机视线，如货物超过驾驶者视线，则需要倒退行驶，或者由专人在旁进行指引，但指挥员不得站立在叉车行进路线内，应在驾驶者侧向可视范围内；

- When stop moving, never suspend goods in air. After unloading, driver should drop the fork down to the normal driving position, and then move.

停车后，禁止将货物悬于空中。卸货后，应先降货叉至正常的行驶位置后再行驶；



- Never allow to stand under the forks.

禁止货叉下站人；

- When forklift driver leaves away from the truck, he must switch off the engine, unplug the key.

叉车司机离开叉车时，必须熄火，拔掉叉车钥匙；

- When parking, drop forks to the lowest position, brake, turn off power, and never park on slope that its gradient is greater than 5%.

停放时，应将货叉降到最底位置，拉紧后刹车，切断电路，并不能停放在坡度大于 5% 的路段上。

- Avoid stopping on slope, if it is inevitable, take the wedge block the wheels, tighten the handbrake and switch off the forklift engine.

应避免停在斜坡上，如不可避免，则应取木楔挡住车轮，拉紧手刹，并熄火；

**After loading or unloading 工作后:**

- When completing job, follow these steps:  
完成工作后须按下列要求进行操作:
  1. Park the forklift with forks in lowest position  
降下货叉
  2. Engine off  
熄火,电源关掉
  3. Applied parking brake  
拉上手刹
  4. Take the key away  
拿掉钥匙
- After parking forklift, the key should be placed a designated key box.  
叉车不使用时, 叉车锁匙必须拔掉, 放置在规定的地方。



**Care the route**  
注意行驶道路



**Never run away**  
禁止擅离职守



**Care the height limit**  
注意空洞、桥梁高度



**Never use for man load**  
禁止叉车载人



**Never over load**  
禁止超载



**Never block the driver's view**  
禁止载物阻挡司机视线



## 22. Manual Handling

### 人工搬运

There are lots of works in project needing using manual or transportation tools to handle. Manual handling is heavy manual labor. If involving bad cooperation, improper tools, it is likely to cause muscle or ligament injury.

项目现场内存在使用手工或用简单的工具进行搬运工作，手工搬运是比较繁重的体力劳动，如果互相配合不好、工具使用不当，也容易造成肌肉或韧带伤害。



#### (1) Precautions for manual handling

##### 个人手动搬运注意事项

- If the weight of objects is greater than 16 to 20 kg, it will increase the risk of back injury.

大于 16 至 20 公斤的物体将增加背部受伤的风险；

- Never attempt to manual handling and lifting objects heavier than 55 kg.

不要尝试人工搬运和提取重于 55 公斤的物体；

- If the weight of handling objects is more than 25Kg, use mechanical handling tools or arrange several



people co-handling.

搬运中的物体超过 25Kg，应使用机械搬运工具或几个人一起搬运；

- There must be enough lighting or illumination at the working area.

注意搬运现场有充足的光线或照明；

- When carrying heavy loads, ensure barrier-free access on the transporting route and be aware clearly of the position of obstacles that cannot be removed, to prevent tripping or bruised.

当搬运重物时，确保在无障碍的通道上进行运输，清楚行进路线上各障碍物的位置，防止被绊倒或者撞伤；

- Use trolleys and other auxiliary transportation equipment to carry the large, bulky objects.

使用手推车等辅助设备来搬运和移动一些大型、笨重和体积不同的物件。

## (2) Basic skills for manual handling 基本的搬运技巧

- a) Before carrying objects, keep close to the object, estimated its weight, size and shape.

靠近要搬运的物体，估计下重量、尺寸以及形状；

- b) Decide how to grab the object, the walking routes, final settle position of the object.  
应确定如何抓起物体，行走路线，物体最终的摆放位置；

- c) Before lifting any objects, and evaluate your own ability, never try to exceed your own ability to carry heavy loads. If the object is too heavy to you, Search help or use mechanical handling tools.

开始提起重物前，先考虑自身的能力，不要试图搬运超过自身能力的重物；  
如果物体太重应寻求帮助，或使用机械搬运工具；

- d) Keep one foot close to the object side, the other foot back to the subject. Keep your feet comfortable and firmly standing. Make sure the weight center of the object concentrated between two legs.

将一只脚靠近物体侧面，另一只脚放在物体后，保持双脚舒适并稳固站着；  
将物体重量集中在双腿；

- e) When carrying heavy loads, keep your back straight.

在搬运重物时，要保持背部挺直；



- f) When gripping loads, objects should be close to the body, with the leg muscle strength, instead of using the waist muscles.  
Slowly lift upright, keeping objects close to the body;  
当握紧重物时，应将重物贴近身体，用腿部肌肉力量，而非使用腰部肌肉的力量；直立地慢慢抬起，保持物体紧贴身体；
- g) Bend knees, grab object with both hands palms, and tighten the chin, keeping your back straight. When lifting the object again, evaluate its weight again.  
双膝弯曲，用双手手掌抓起物体，收紧下巴，保持背部伸直；抬起物体的同时再次估计其重量；
- h) When moving and turning, move with the foot rather than turning the body and waist.  
移动转动东西时，应借助脚的移动，而非转动身体；
- i) When putting object down, use leg and back muscles, bend your knees, and then lower the weight.  
将物体放下时，利用腿部和背部肌肉的力量，弯曲膝盖，然后放下重物。

## 23. Chemical Safety

### 化学品安全

#### 1. General Requirement for Chemical 现场化学品的一般要求

- Follow the relevant National Chemical Regulations and Rules for proper handling, labeling, transportation, use, storage.

必须按国家和项目内有关规定，进行正确处理、标签、运输、使用、储存；

- The latest chemicals material safety data sheets (MSDS) must be kept in subcontractor office.

项目内使用化学品的办公室最新物料安全数据表；

- All personnel must be familiar with all hazardous chemicals for their working area.  
所有人员必须熟知在工作区域内所有化学品的危险性；
- For (International Maritime Dangerous Goods) IMDG Hazard Symbols and definitions, please refer to Appendix II: The signs of United Nations Transporting Dangerous Goods

(国际海上危险货物运输组织) 国际危规危险品标志及定义请参考附录二：联合国危险货物运输标志

#### 2. GHS signs and definition GHS 标志及定义：

GHS label/GHS 图标	Definition 定义
	Flammable gas, liquid and solid; Self-reactive substances; Pyrophoric liquid and solid; Self-heating substance; Substance which in contact with water, emit flammable gas, organic peroxide. 可燃性气体、易燃性、易燃性压力下气体、易燃液体和固体；自反应化学品；自燃液体和固体；自热化学品；遇水放出易燃性气体化学品、有机过氧化物。
	Burning aidant, oxidant gas, liquid and solid. 助燃性、氧化性气体类、氧化性液体、固体。
	Powder; Self-reactive substances; Organic peroxide. 火药类；自反应性化学品；有机过氧化物。
	Corrosive to metal; Skin corrosive/irritant; Serious eye damage/irritant. 金属腐蚀性；皮肤腐蚀性、刺激性；对眼有严重的损伤、刺激性。
	Compressive gas. 压力下气体。
	Acute toxicity. 急性毒性、剧毒。
	Acute toxicity; skin corrosive/irritant; serious eye damage/irritant; Skin sensitization; Specific target organ systemic toxicity-single exposure. 急性毒性 / 剧毒；皮肤腐蚀性、刺激性；严重眼睛损伤 / 眼睛刺激性；引起皮肤过敏；对靶器官、全身有毒害性。
	Respiratory sensitization; Germ cell mutagenicity; Carcinogenicity; Reproductive Toxicity; Specific target organ systemic toxicity-single exposure. 引起呼吸器官过敏；引起生殖细胞突变；致癌性；对生殖毒性；对靶器官、全身有毒害性；对吸入性呼吸器官有害。
	Hazardous to the aquatic environment. 对水生环境有害性。

### 3. Requirement for Chemical using 化学品使用要求

- Chemical management must be done by designated staff who should take charge of inventory, receiving and records.

项目内物料领取必须由经过指定人员进行管理，做好领用和存量等登记记录；

- Flammable material must be stored with correct labeled. Unopened drums or containers of flammable chemical must be grounded and stored at good ventilation warehouse.

易燃液体应储存于贴有标签，原装、未开启的装运容器，必须接地、通风；

- Hazardous chemicals must be stored in site dangerous chemical warehouse or designated fire-proof cabinet in workshop.

危险化学品必须存放在项目内指定的危险化学品仓库或车间专用防火柜内；

- Dangerous chemical containers should be placed in cofferdam and kept at least 6 meters away from fireworks, welding, burning, other heat sources.

危险化学品容器应放在设有堤坝的围栏内，距烟火、焊接、燃烧和其它热源至少 6 米距离；

- Paint and oil must be placed in a dedicated cool, ventilated sheltered storage area, never expose to sun and rain.

现场涂料和油料必放置在阴凉、通风有遮蔽的专门储存区域内，禁止日晒雨淋；

- Never contact with acidic, corrosive, flammable or other hazardous materials without appropriate safety measures and PPE.

若无安全预防措施和适当的个人保护设备，禁止接触酸性、腐蚀性、易燃或其他危险材料；

- When using liquid chemicals, leakage control measures should be in place. If leakage incident occurs, immediately report to PROJECT SAFETY OFFICE and on duty supervisor and then take the leakage control response.



使用液体化学品时，必须防止泄漏，如若发生，则立即报告项目安全办公室主管，然后采取泄露控制响应；

- Chemical leakage control must be done by trained and qualified personnel with proper PPE.

化学品泄露处理人员必须由经培训，并穿戴适当个人防护用品的人员进行；

- Used empty containers or drums must be stored in designated area, packaged and labeled according to its chemical properties.

使用完的空容器不得随意堆放，必须放置在项目内的定点位置，并根据原来储存物的具体化学性质做好防护措施。

## 24. Waste Storage and Disposal

### 废弃物储存及处理

#### 1. General Requirement for Waste

##### 废弃物管理的一般规定

- Project safety office is responsible for site waste management, including: classification, storage, handling, external transportation and disposal and registration etc.

安全办公室负责对项目内废弃物分类、储存、装卸、外部运输安排、处置、登记等管理事宜。

- Waste must be pasted with unified label.  
项目内使用统一的废弃物标签；
- All units are responsible for their own waste classification and packaging.  
所有产生废弃物的单位负责废弃物的分类、包装工作；
- Designated person and teams are responsible for project waste transfer work.  
项目内指定专门人员进行废弃物转运工作；

#### 2. Requirements for dangerous waste disposal

##### 项目内危险废弃物处理要求：

- Before storing waste into storage are, paste the unified label on package.

废物入暂存区前张贴废弃物标签；

- Waste package must follow requirement that should avoid the following situation, such as: leakage, broken package or other conditions.

废弃物根据要求固定、包装，不存在“冒跑滴漏”等状况；

- When storing waste in container, waste must be placed from inside to outside of container, two pallets by two pallets. Never store only at one side.

货物摆放，必须由内而外，逐板放置，禁止将叉板全部单边摆放；



- Chemical containing adsorbent material should be contained into a chemical waste bag (yellow bag).

将含有化学废液的吸附材料必须放置在化学废物收集袋内（黄色袋）；

- Never directly discharge waste into environment. All dangerous waste should be handled by designated qualified waste disposal company.

禁止将废弃物直接排放环境，应由指定有资质的处理商进行处理；



**Category for office dangerous waste 办公室危险废弃物种类有：**

1. Li-ion Battery 锂电池
  2. Ink cartridge 墨盒
  3. Toner cartridges 硒鼓
  4. And tube etc 和灯管等
- They are collected and handed over to the reception, and then grouped together to Project safety office for disposal.

收集后交给各前台集中收集，然后再统一归类到安全办公室；

## 25. Emergency Response

### 应急响应

There are four times quarterly drilling and four firefighting practice for one year. The purpose is to ensure all staff have training for emergency, when the emergency occurs, personnel can safely and successfully evacuate to Muster Point.

项目内每年根据现场人员安排，分别安排了四次演习，每季度一次。四次消防设备实操演练。目的是保证所有人员均接受过应急培训，在事故发生时，人员能够安全、顺利地撤离至紧急集合点。

- (1) Set two Muster points in Project

项目内应设置两个紧急集合点；

- (2) By emergency response training, can ensure all personnel are familiar with emergency equipment and the evacuation way.

进行应急培训，保证所有人员熟悉应急设备及紧急逃生通道的位置；

- (3) At every entrance, it is equipped with an emergency evacuation map.

在各个主要通道及出入口均配置了紧急逃生通道图；

- (4) In the map, you can find your current position, the nearest exits, first aid kit, and the location of fire-fighting equipment.

图中明确了人员当前位置、最近的逃生出口、急救药箱位置，以及灭火器材的位置；

- (5) There are one stretcher and one first aid kit in Project management room.

项目办公室设置担架、药箱等急救设施；

- (6) All working area must keep one 4m width way for firefighting and ambulance support.

所有施工区域必须留有一条 4 米宽的消防、急救车通道；保证消防、急救车可以到达项目内任何区域；

- (7) When fire incident happens, set one designated guider for external support at the traffic crossing.

发生急救及火灾事故时，必须派专人在路口等待，引导急救车及消防车



进入施工工地；

- (8) There is one emergency contract card in guard room.

在保安室有紧急联系人员联系卡

- (9) When incident happen, please inform Project safety office immediately.

发生事故后，应立即通知现场管理人员及项目安全办公室管理人员。

- (10) In case of a large scale of fire or other emergency cause evacuation, please check the wind sock and choose the right evacuation way to the right muster point.

项目内大面积火灾或者受其他区域影响紧急撤离时，请注意风方向从而决定撤离方向，以下位置可以看到风向标：

- (11) All first aid kit caretakers should do the daily check with seal or medicine, if anyone use the medicine, please refill according to medicine list in kit. If discover someone use medicine, please report to on duty supervisor.

各位药箱负责人，需要对药箱进行日常检查，确认铅封是否完好，如有使用药品，则填写药箱内清单，并报告当值班长报告。

- (12) If need to replenish medicine in kit, please come to project safety office room for application.

如药箱内药品不足，药箱负责人项目安全办公室领取药品。


# Appendix I Chemicals Classification

## 附录一 化学品种类说明

 <p>不燃气体 UN Transport symbol for non-inflammable gases</p>	 <p>易燃气体 UN Transport symbol for inflammable gases</p>	 <p>有毒物品（第 2 类和第 6.1 类） UN Transport symbol for poisonous substances (gases Class 2., other poisonous substances Class 6.1)</p>
 <p>易燃气体（第 2 类）或者易燃液体（第 3 类） UN Transport symbol for inflammable gases (Class 2) or liquids (Class 3)</p>	 <p>易燃固体（第 4 类） UN Transport symbol for inflammable solids (Class 4)</p>	 <p>易自燃物品 UN Transport symbol for substances liable to spontaneous combustion</p>
 <p>遇水释放出易燃气体的物品 UN Transport symbol for substances which, in contact with water, emit inflammable gases</p>	 <p>氧化剂和有机过氧化物 UN Transport symbol for oxidizing substances and for organic peroxides</p>	 <p>感染性物品 UN Transport symbol for infectious substances</p>
 <p>放射性物品（第 I 级） UN Transport symbol for radioactive</p>	 <p>放射性物品（第 II 级） UN Transport symbol for radioactive</p>	 <p>放射性物品（第 III 级） UN Transport symbol for radioactive</p>

substances, Category I	substances, Category II	substances, Category III
 <p>放射性物品 UN Transport symbol for radioactive substances</p>	 <p>腐蚀性物品 UN Transport symbol for corrosive substances</p>	 <p>危险性类别编号的位置: ** Location of serial number: **</p>


#### 第一类：爆炸物质和物品



(NO.1)


**第 1.1, 1.2 和 1.3 类**

符号（爆炸的炸弹）：黑色；底色：橙黄色；数字“1”写在底角



(NO.1.4)

**第 1.4 类**



(NO.1.5)

**第 1.5 类**



(NO.1.6)

**第 1.6 类**

底色：橙黄色；数字：黑色；数字高大约为 30mm，字体笔画的宽度约 5mm  
（对于 100mmX100mm 的标志）；数字“1”写在底角

\*\* 属于危险类别的位置---如果属于副危险性则留空  
\* 属于配装组的位置---如果属于副危险性则留空

#### 第二类：气体



(NO.2.1)

### 第 2.1 类 易燃气体

符号（火焰）：黑色或白色；底色：红色；数字“2”写在底角



(NO.2.2)

### 第 2.2 类 非易燃，无毒气体

符号（气瓶）：黑色或白色；底色：绿色；数字“2”写在底角



(NO.2.3)

### 第 2.3 类 有毒气体

符号（骷髅和交叉的骨头棒）：黑色；底色：白色；数字“2”写在底角

第三类：易燃液体



(NO.3)

符号（火焰）：黑色或白色；底色：红色；数字“3”写在底角

#### 第四类



(NO.4.1)

##### 第 4.1 类 易燃固体

符号（火焰）：黑色；  
底色：白色加上七条竖直红色条带；  
数字“4”写在底角



(NO.4.2)

##### 第 4.2 类 易自燃物质

符号（火焰）：黑色；  
底色：上半部为白色，下半部为红色；  
数字“4”写在底角



(NO.4.3)

##### 第 4.3 类 遇水放出易燃气体的物质

符号（火焰）：黑色或白色；  
底色：蓝色；  
数字“4”写在底角



#### 第五类



(NO.5.1)

##### 第 5.1 类 氧化剂（物质）

符号（圆圈上带有火焰）：黑色； 底色：黄色；  
数字“5.1”写在底角



(NO.5.2)

##### 第 5.2 类 有机过氧化物

数字“5.2”写在底角

## 第六类



(NO.6.1)

### 第 6.1 类 有毒物质

符号（骷髅和交叉的骨头棒）：黑色；

底色：白色； 数字“6”写在底角



(NO.6.2)

### 第 6.2 类 感染性物质

标志的下半部可以标上“INFECTIOUS SUBSTANCE”（感染性物质）以及

“In the case of damage or leakage immediately notify Public Health Authority”

（“如发生损伤或泄漏立即通知公共卫生机关”）的字样

符号（三个新月性符号沿一个圆圈重叠在一起）和文字：黑色；底色：白色；

数字“6”写在底角

## 第七类：放射性物质



(NO.7A)

### I 级----白色

符号（三叶型）：黑色；底色：白色；

文字：（强制性要求），在标志的下半部分用黑体标出：

RADIOACTIVE（放射性） CONTENTS...（内容物名称） ACTIVITY...（强度为...）

紧跟“放射性”字样的后面标上一条垂直的红色短杠；数字“7”写在底角



(NO.7B)

II 级---黄色



(NO.7C)

III 级---黄色

符号（三叶型）：黑色；底色：上半部黄色加白边，下半部白色。

文字：（强制性要求），在标志的下半部分用黑体标出：

RADIOACTIVE（放射性） CONTENTS...（内容物名称） ACTIVITY...（强度为...）

在一个黑框里标出：TRANSPORT INDEX..（运输指数）

紧跟“放射性”字样的后面标上

二条垂直的红色短杠

紧跟“放射性”字样的后面标上

三条垂直的红色短杠

数字“7”写在底角



(NO.7E)

第 7 类裂变物质

底色：白色；文字（强制性要求），在标志的上半部用黑体标出：

FISSILE（裂变性）字样：

在一个黑框内标出：Criticality Safety index.....（临界安全指数）

数字“7”写在底角

第八类：腐蚀性物质



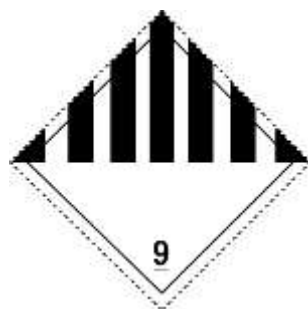
(NO.8)



符号（液体，从两个玻璃容器流出来侵蚀到手和金属上）：黑色

底色：上半部白色，下半部黑色带白边；数字“8”写在底角

第九类：杂类危险物质和物品



(NO.9)

符号（在上半部有 7 条垂直条带）：黑色；底色：白色；数字“9”写在底角

## Appendix II falling Rescue Guideline

### 附录二：高空坠落救援指导

Faling at height injury means falling from height, suffer from the high-speed impact at people's daily work or life, so that the body and organs have been damaged to some extent caused by the impact.

高空坠落伤是指人们日常工作或生活中，从高处坠落，受到高速的冲击力，使人体组织和器官遭到一定程度破坏而引起的损伤。

It is prevalent in construction and installation, working at height. There are usually multiple systems or multiple organ damage, sometime serious died on the spot. In addition to falling at height injury directly or indirectly hurt the organs, it still includes coma, respiratory distress, pale, apathy, and other symptoms that can lead to widespread damage at chest, abdominal visceral organs.

多见于建筑施工和电梯安装等高空作业，通常有多个系统或多个器官的损伤，严重者当场死亡。高空坠落伤除有直接或间接受伤器官表现外，尚可有昏迷、呼吸窘迫、面色苍白和表情淡漠等症状，可导致胸、腹腔内脏组织器官发生广泛的损伤。

When falling at height, the feet or buttocks first landing, force transmitted to the brain along the spine。

高空坠落时，足或臀部先着地，外力沿脊柱传导到颅脑而致伤；

When falling at height, back or waist by the impact, which can cause lumbar anterior longitudinal ligament tear, split of vertebral fractures, can lead to spinal cord injury.

由高处仰面跌下时，背或腰部受冲击，可引起腰椎前纵韧带撕裂，椎体裂开或椎弓根骨折，易引起脊髓损伤。

Brain stem injury often have heavier consciousness problems, light reflex and other symptoms, may also have serious complications appeared.

脑干损伤时常有较重的意识障碍、光反射消失等症状，也可有严重合并症的出现。

Key of Rescue: cease bleeding, fracture fixation, and maintain normal breathing.

拯救关键：止血、骨折固定、维护正常呼吸

## (1) **Precaution for rescue 救援注意事项**

- (a) confirm the fracture: If local swelling, from the "big package", especially when moving or touching the injured limb, the wound seems to be able to hear the "cracking" sound, feet unable to stand, unable to lift the upper body, there fracture suspicion should press bandaged fracture treatment to avoid serious consequences.  
确认是否骨折：如果局部红肿，起“大包”，尤其是移动或触摸伤肢时，伤处似能听见“卡嚓”的响声，脚无法站立，上肢无法提起物体，便有骨折的怀疑，应先按骨折包扎处理，以免引起严重后果；
- (b) Fixed: with plywood, bandages, and dressings. If lack of these items, books, cardboard, sticks, twigs, etc. can be used to fix fracture, bandages can be replaced by torn clothes.  
固定：用夹板、绷带、合理包扎，没有这些物品时，书刊、纸板、木棍、树枝等可以作为固定骨折所用的夹板，绷带可以用衣服撕成条状代替；
- (c) Rescue: generally require professional medical treatment. Never move the victim without fixed the wound.  
救援：一般需要专业的医护人员处理，在没有将伤处固定的情况下不能搬动，
- (d) Transitting: If no stretcher, you can use clothes and other temporary material be made a stretcher. 3 to 5 people to be a ground to move patient onto the stretcher. The patient can head at the rear, feet forward. All people should keep at same pace so that the patient will kept at a horizontal state.  
搬运：如果没有担架，可以用被服等制成结实的临时担架，由3至5人合成一组，将坠落者抬上担架，病人能够头部在后，脚在前，抬担架的人脚步、行动要一致，使病人保持在水平状态。

## (2) **On the spot medical treatment 急救方法**

If you are unsure how to rescue, never try to move the falling personnel, you shall promptly notify the hospital and ask support by professionals.

如果不清楚如何进行救护，切勿贸然挪动坠落人员，应迅速通知医院，由专业人员进行救护。

- a. Check falling spot that can help evaluate the severity of the injury.

检查落下地点，这有助于判断伤势的严重程度；

- b.** After falling, this person must be rescued within 20 minutes. When preparing work at height, all rescue facilities must be in place.

在人员坠落后，必须在 20 分钟内对人员进行营救。高空作业前，必须保证在工作范围内有充足的救援设施；

- c.** After being rescued, this person must keep his original posture, prevent excessive blood flowing into his heart to cause heart pressure is too high to be loaded.

人员被解救后要保持他原来的坐姿，防止血液过快流进心脏，导致心压过高负荷不了；

- d.** After rescuing the falling person to a safe location, remove all hard objects in his pockets and his harness.

将人员救落至安全位置后，去除伤员身上的安全用具和口袋中的硬物；

- e.** When handling and transitting, neck and trunk flexion cannot be reversed, should keep the spine straight, never transit hy this method: one people take legs, one take shoulders. This method can cause aggravate paraplegia.

在搬运和转送过程中，颈部和躯干不能前屈或扭转，而应使脊柱伸直，绝对禁止一个抬肩一个抬腿的搬法，以免发生或加重截瘫；

- f.** You can provide local proper trauma dressing, but never fill this open wound that is suspected skull fracture or leakage of cerebrospinal fluid. It can cause intracranial infection.

创伤局部妥善包扎，但对疑颅底骨折和脑脊液漏患者切忌作填塞，以免导致颅内感染；

- g.** The wounded with maxillofacial injury should be kept to open air. Remove his dentures, tissue fragment, blood clots, oral secretions, etc. and loosen the position for his neck, release chest buttons. If the foreign body in mouth or under tonque cannot be cleared, in order to make him breath, you can used 12th needle puncture his cricothyroid membrane as early as possible for tracheotomy.

颌面部伤员首先应保持呼吸道畅通，撤除假牙，清除移位的组织碎片、血凝块、口腔分泌物等，同时松解伤员的颈、胸部钮扣。若舌已后坠或口腔内异物无法清除时，可用 12 号粗针穿刺环甲膜，维持呼吸、尽可能早作气管切开；

- h.** Combined injury can require him to keep supine position in open air, loosen collar buttons.

复合伤要求平仰卧位，保持呼吸道畅通，解开衣领扣；

- i.** Peripheral vascular injury, compress the artery above the truncus bone portion. Press thick dressings directly on the wound. Use bandages with no bleeding and not affect blood circulation is appropriate and effective. If all mentioned above cannot work, used tourniquet with caution. In principle, minimize the use time, generally less than 1 hour is appropriate. Well marked, indicate the tourniquet time.

周围血管伤，压迫伤部以上动脉干至骨骼。直接在伤口上放置厚敷料，绷带加压包扎以不出血和不影响肢体血循环为宜，常有效。当上述方法无效时可慎用止血带，原则上尽量缩短使用时间，一般以不超过 1 小时为宜，做好标记，注明上止血带时间；

- j.** If possible, provide intravenous rehydration injection.

有条件时迅速给予静脉补液，补充血容量；

- k.** Send to hospital for professional treatment as soon as possible.

快速平稳地送医院救治。

## Appendix III Checking Guideline for Lifting Accessory

### 附录三：起重机具检查标准

#### (1) wire rope inspection standards 钢丝绳检查标准

**These following conditions happen, the rope must be discarded.**

发生下列任一情况，该钢丝绳必须立即报废。

- Broken wire close together.

断丝紧靠一起形成局部聚集

- One whole share of rope fracture, the rope must be discarded.

出现整根绳股的断裂；



- When the fibers core of cable or steel core damage (or multilayer structure of the inner strands) fracture caused rope diameter significantly reduced.

当钢丝绳的纤维芯损坏或钢芯（或多层结构中的内部绳股）断裂而造成绳径显著减小时；

- The fiber core comes out from the wire rope or the wire becomes flat.

发现钢丝绳的纤维芯绳从钢丝中穿出或吊绳变扁；

- Although wire sling is not broken, but the whole wire is hard to be bent and its diameter is reduced. This condition will cause in a sudden rupture under dynamic loads.

虽未发现断丝，但钢丝绳明显的不易弯曲和直径减小，这种情况会导致在动载作用下突然断裂；

- Owing to wear to cause cross-sectional area of wire rope reduced, the rope's intensity also decreases. When the outer layer of wire rope caused by the loss of 20% nominal diameter, this rope must be discarded.

磨损使钢丝绳的断面积减小因而强度降低；当外层钢丝磨损造成 20%公称直径损失时；

- When discovering 10% broken wire within a distance of this wire rope that the length is 8 times the diameter of the rope, this wire rope must be discarded. For compliance with "round strand wire rope" standard, the broken wire and wear indication can refer to the following standards.

钢丝绳 8 倍直径距离内，破损钢丝达到 10%，此钢丝绳必须报废；对于符合《圆股钢丝绳》标准的钢丝绳，在断丝与磨损的指标上，也可按下述要求检查报废：

断丝数 (根) 安全系数		钢丝绳结构 (GB 1102—74)							
		绳 6W (19)		绳 6× (19)		绳 6× (37)			
		一个节距中的断丝数							
		交互捻		同向捻		交互捻		同向捻	
小于 6		12		6		22		11	
6~7		14		7		26		13	
大于 7		16		8		30		15	

**Remark 备注：**

1. In this table, broken wire number is the number of thin wire of each share. Thick wire is equal to 1.7 thin wire.

表中断丝数是指细钢丝，粗钢丝每根相当于 1.7 根细钢丝；

2. A round of wire means the distance wire twisting around axis.

一个节距，指每股钢丝绳缠绕一周的轴向距离；

- If there are corroded or frayed at wire rope, it should be converted the broken wire number referring to the table.

钢丝绳有锈蚀或磨损时，应将上表报废断丝数按下表折减，并按折减后的断丝数报废；

钢丝表面磨损量或锈蚀量%	10	15	20	25	30~40	大于 40
折减系数%	85	75	70	60	50	0

- By visually observation method, inspect the corrosion situation of wire. When discovering deep pit at surface of wire, a considerable loss occurs, discard this wire.

肉眼观察外部钢丝的腐蚀情况，当表面出现深坑，相当松弛时，报废该钢丝绳；

- When the outer strands become detached or when the outer strand is longer than the internal strand. This kind of deformation occurs, we call it: cage-like distorted wire rope, this wire must be discarded.

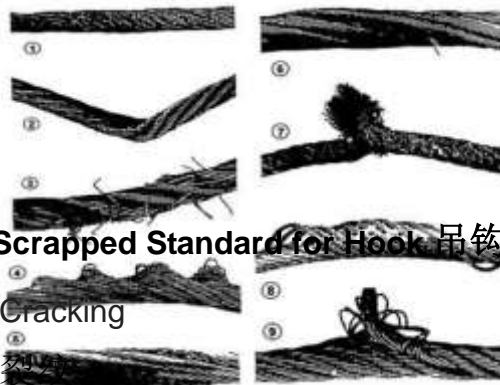
当外层绳股发生脱节或者变得比内部绳股长的时候就会发生这种变形；



笼状畸变的钢丝绳；

- Wire with the extruded strand, if this deformation situation is severe, then the rope must be scrapped. The extrusion deformation was part of the arch wire or wire bundle forms a ring, it is often caused by the impact loads.

绳股挤出的钢丝绳, 若此种变形严重时, 则钢丝绳必须报废; 挤出变形是一部分钢丝或钢丝束拱起形成环状; 这种变形常因冲击载荷而引起。



## (2) Scrapped Standard for Hook 吊钩报废标准

(a) Cracking

(b) Dangerous section wear up to 10% of the original size

危险断面磨损达原尺寸的 10%;

(c) The degree of opening increased by 15% compared with the original size

开口度比原尺寸增加 15%;

(d) Torsion more than  $10^\circ$  compared with the original size

扭转变形超过  $10^\circ$  ;

(e) Dangerous section or hook neck plastic deformation

危险断面或吊钩颈部产生塑性变形;

(f) Bushing of plate hooks wear up to 50% of the original size, should be scrapped bushing

板钩衬套磨损达原尺寸的 50%时, 应报废衬套;

(g) Mandrel section of plate hook wear up 5% of the original size, should be scrapped mandrel

板钩心轴磨损达原尺寸的 5%时, 应报废心轴。

## (3) Textile Lifting slings 编制吊索

(a) Before use, lifting sling must be checked to ensure intact, free of burns, discoloration, knotting, and fracture.

使用前必须检查吊装带, 确保完好无损, 必须无烧伤, 褪色, 打节, 断裂等

(b) Check and ensure the signage is identified and legible.  
检查确保标识和标牌清晰可读。

(c) Check and ensure the safe working load of sling.  
检查确保吊装带的安全工作负荷。

#### **(4) Scrapped Standard for Slings 吊装带报废条件**

(a) Serious wear and tear, perforation, cuts,  
严重磨损、穿孔、切口、撕断。

(b) Bearing seams blooming, sutures wear off  
承载接缝绽开、缝线磨断。

(c) Sling fiber is aging, elastic deformation, strength weakened  
吊带纤维老化、弹性变小、强度减弱。

(d) Fiber surface is roughness to be easily peeled  
纤维表面粗糙易于剥落。


(e) Deadlock occurs  
吊带出现死结。

(f) There are too much spots losse, corrosion, acid burning and hot melt or burn on the sling surface  
吊带表面有过多的点状疏松、腐蚀、酸碱烧损 以及热熔化或烧焦。



## Technical Factors of Fiber Sling

柔性吊装带系列技术参数

实际承载能力: 方式系数P *额定载荷							近似直径 (mm)
编 号		破断载荷 (kg)	破断载荷 (kg)	P=0.8 栓结吊升 (kg)	P=1.8 45度角吊升 (kg)	P=1.4 90度角吊升 (kg)	
01		6000	1000	800	1800	1400	18
02		12000	2000	1600	3600	2800	20
03		18000	3000	2400	5400	4200	22
05		30000	5000	4000	9000	7000	27
08		48000	8000	6400	14400	11200	38
10		60000	10000	8000	18000	14000	45
12		72000	12000	9600	21600	16800	49
15		90000	15000	12000	27000	21000	58
20		120000	20000	16000	36000	28000	64
30		180000	30000	24000	54000	42000	78
40		240000	40000	32000	72000	56000	83
50		300000	50000	40000	90000	70000	96
60		360000	60000	48000	108000	84000	105
70		420000	70000	56000	126000	98000	113
80		480000	80000	64000	144000	112000	127
90		540000	90000	72000	162000	126000	139
100		600000	100000	80000	180000	140000	150

## Appendix IV Guideline of First Aid

### 附录四：急救一般常识

When fracture, dislocation, concussion, shock and other injury occurs, provide first aid treatment as soon as possible. Having basic first aid knowledge is necessary for saving life. 当发生骨折、关节脱位、脑震荡、休克等较重的伤害时,及时实施急救,挽救生命。所以掌握一些基本的急救方法是非常必要的。

When serious injury occurs, evaluate the actual situation, the sequence should be: 当发生重大损伤后,要判断情况,顺序做作如下处置:

- First ask the wounded to make sure whether he still beconscious or not.  
先呼叫伤者,判断伤者有无意识。
- Check whether there is breathing, if breathing with being unconscious, you should first let the injured keep breathing, and then placed him at comfortable posture, implement insulation; if there is trauma, to provide dressing, and then send him to hospital for further treatment.  
判断是否有呼吸,如果是有呼吸的昏迷,应首先保障伤者的呼吸通畅,然后将其置于舒适体态,实施保温;如果有外伤,要实施包扎、然后搬运等手段将其送至医院,实施进一步救治。
- If no breathing, immediately provide artificial respiration.  
如果没有呼吸,就立即施行口对口人工呼吸。
- If no pulse, we must implement external cardiac massage (cardio-pulmonary resuscitation--CPR) .  
如果没有脉搏,就要实施胸外心脏按摩(心肺复苏)。
- If having bleeding wound, first cease bleeding, bandaging.  
如有伤口出血,先施行止血、包扎。
- For fracture or dislocation, using simple splint fix the injured limb.  
对骨折或脱臼者,采用简易夹板固定伤肢。
- For dislocation patients, if you cannot have the entire complex technology, never do reconstructive surgery to avoid increasing the suffering of patients with new injury.

对关节脱位患者，如果不具备整复技术，不可随意做整复手术，以免增加患者新的痛苦。

- For concussion patients, should immediately let supine, and make head cold.

对脑震荡患者，应立即让其平卧，并作头部冷敷。

## (1) **First aid for heatstroke** 中暑的现场急救

**Move:** Move the patient rapidly to cool and well ventilated place, and elevate the head, unlock the cloths in order to good breathing and heat dissipation.

**移:** 迅速将病人移至阴凉、通风的地方，同时垫高头部，解开衣裤，以利呼吸和散热。

**Compress:** compress cold towel or ice packs on the patient's head, armpit, thigh etc.

**敷:** 可用冷水毛巾敷头部，或冰袋、冰块置于病人头部、腋窝、大腿根部等处。

**Cool:** keep the patient in 4 °C water and provide massage to limbs, make skin blood vessels dilate, accelerate blood circulation, and promote cooling.

**促:** 将病人置于 4℃ 水中，并按摩四肢皮肤，使皮肤血管扩张，加速血液循环，促进散热。

**Dip:** The patient was at 45-degree body immersed in about 18 °C water and ensure the water is little higher than his nipple. The elderly, the infirm and cardiovascular disease, this water temperature is too low to tolerated.

**浸:** 将患者躯体呈 45 度浸在 18℃ 左右水中，以浸没乳头为度。老年人、体弱者和心血管病患者，不能耐受过低水温。

**Rub:** four people simultaneously rub patient's body to let the skin turn red with a towel soaked in water, usually rub 15-30 minutes, make the temperature drop to 37-38 °C. If the brain were not seriously damage, he will be quickly conscious.

**擦:** 四个人同时用毛巾擦浸在水中的患者身体四周，把皮肤擦红，一般擦 15-30 分钟左右，即可把体温降至 37-38℃，大脑未受严重损害者多能迅速清醒。

## (2) **Frist aid forelectric shock** 触电的现场急救

- **Turn off the main power** 切断总电源

If the power switch is in vicinity, cut off the power quickly. If not, take the next step.

如果电源总开关在附近，则迅速切断电源，否则采取下一步措施。

- **Break away from power 脱离电源**

Use insulating material (wood, plastic, rubber, books, leather belts, cotton, linen, porcelain, etc.) quickly separate electric wire and the wounded. Prevent electric shock after another.

用绝缘物（木质、塑料、橡胶制品、书本、皮带、棉麻、瓷器等）迅速将电线、电器与伤员分离。要防止相继触电。

- **(cardio-pulmonary resuscitation--CPR) 心肺复苏**

Heartbeat, respiratory arrest should be provided immediately cardio-pulmonary resuscitation.

心跳、呼吸停止者立即行心肺复苏。

- **Dress the electrical burn wound 包扎电烧伤伤口**

- **Send to hospital for professional treatment 速送医院治疗**

### (3) **Shock 休克**

#### a. **Category of Shock 休克分型**

According to the etiology of shock, it includes: cardiogenic shock, septic shock, hypovolemic shock, anaphylactic shock.

根据引起休克的病因，可将其分为：心源性休克、感染性休克、低血容量性休克、过敏性休克。

#### b. **The likeliest shock in site 现场可能会遇到的主要是**

Hypovolemic shock (trauma, bleeding, burns, severe diarrhea and other causes)

低血容量性休克（创伤、出血、烧伤、严重腹泻等引起）。

#### c. **Presenting symptoms 表现症状主要有**

- Feel discomfort dizziness or nervousness dizziness, hyperventilation.

自感头昏不适或精神紧张、过度换气；

- Lower blood pressure, adult systolic blood pressure is less than 90mmHg.

血压降低，成人收缩压低于 90mmHg；

- Clammy limbs, pale skin, or cyanosis, sometimes accompanied by sweating.

肢端湿冷、皮肤苍白或发绀，有时伴有冷汗；

- No palpable pulse beat or weak.

脉搏搏动未扪及或细弱；

- Restlessness, irritability, or conscious indifference, lethargy, coma.

烦躁不安，易激惹或神志淡漠，嗜睡，昏迷；

- Decreased urine output or no urine.

尿量减少或无尿。

#### d. **Principle for on-site first aid 现场救护原则**

- The patient should be supine, legs slightly elevated, in order to facilitate venous return. If breathing difficulties, could be appropriate to raise the head and torso, to facilitate breathing.

病人应取平卧位，下肢略抬高，以利于静脉血回流。如有呼吸困难者，可将头部和躯干适当抬高，以利呼吸。

- Maintain airway patency, especially for shock with coma. Elevate the patient neck and jaw lift, so that keep the maximum head thrown back, and head to one side, to prevent vomit, secretions strayed into the respiratory tract.

保持呼吸道通畅，尤其是休克伴昏迷者。方法是将病人颈部垫高，下颌抬起，使头部最大限度的后仰，同时头偏向一侧，以防呕吐物、分泌物误入呼吸道。

- Pay attention to hypothermia shock patient. Keep them warm by covering quilt or blanket. But the patient with high fever, septic shock should be given to cooling.

注意给体温过低的休克病人保暖，盖上被、毯。但伴发高烧的感染性休克病人应给予降温。

- Patients with traumatic hemorrhagic shock caused by bleeding should take appropriate methods to stop bleeding.

病人因外伤出血引起的出血性休克应采取适当方法止血。

- When having the ambulance emergency calls, simultaneously inform the patient's condition, and wait for emergency medical professionals.

救护同时拨打急救电话，告知病情，等候专业医务人员的急救。

- If close to hospital, escort to hospital for professional treatment.

离医院近的，快速护送至医院抢救治疗。

### (4) **Syncope 晕厥**



**Syncope** is mainly caused by temporary brain ischemia to be instantaneous loss of consciousness (complete loss of consciousness). Loss of consciousness is characterized by sudden onset, and soon disappeared.

晕厥主要是因一时大脑缺血而致的瞬间知觉丧失（意识完全丧失）。知觉丧失的特点是突然发生、很快消失。

Postural syncope is the most common cause (such as from a supine suddenly out of bed and sit up, squatting suddenly stand up).

体位性晕厥是最常见原因（如从平卧突然下床、坐起；蹲位突然站起）。

### **Principle for on-site first aid 现场救护原则**

- Let the patient keep supine, the head can be slightly lowered. (prohibited for falling at height)

迅速让病人平卧，头部可略放低。（高空坠落人员禁止平躺）

- Keep indoor air fresh, maintain patient airway, and unlock the collar, waist belt.

保持室内空气清新，维持病人呼吸道通畅，解开衣领、腰带。

- If the above treatment cannot work, you should make an emergency call.

如经上述处理不见好转，应拨打急救电话，请医生救治。

## Appendix V Contact List

### 附录五 联系方式

#### Contact List

#### 场内外主要人员及机构联系方式

#### 校外紧急联络电话方式

1.	<b>Police</b> 警察 (24-hour)	110
2.	<b>Fire</b> 火警 (24-hour)	119
3.	<b>Ambulance</b> 紧急救护 (24-hour)	120

#### Internal Contract List

#### 校内紧急联络电话方式

1.	<b>Campus Construction &amp; Physical</b> 校园建设部	8807 7082
2.	<b>Campus Security</b> 校园安保部	8807 7110 (24 hours)
3.	<b>Firefighting Department</b> 校消防部门	8807 7119
4.	<b>Campus Clinic &amp; First Aid</b> 校医务室	8807 7120
5.	<b>Campus EHS Office</b> 校安全办公室	8807 7079