	GTIIT_EHS_ISO file	File No.: 文件编号：	GTIIT_EHS_02_14
		Rev. No.: 版本号：	03
		Effective date: 生效日期:	2025-12-01
File name **文件名**	**Lifting safety** **吊装作业**		

Approval process

审批过程

	Name **姓名**	**Title** **职务**
Drafted by **起草人**	Xu Guangxiang 许光祥 Guangshang Xie谢冠上 Adam Dai戴泽侬	EHS Officer EHS Engineer Engineer of CCD
Reviewed by **审阅人**	Yigal Cohen Shaogang Chen陈少刚 Ronghao Wang	PVC & General Director PVC assistant & Safety coordinator Manager, Department of Operation
Approved by **批准人**		Campus Safety Committee;

Reversion records

版本历史记录

Rev. No. **版本号**	**Publication date** **出版日期**	**Rev. reason/ content modified** **再版原因/更改内容**
01	2020-06-01	New file 新建文件
02	2022-06-01	Regularly updated with no major changes. 定期更新，无重大变更内容。
03	2025-12-01	Regular renew 周期审阅更新

Relevant departments (select relevant departments with a "√")

相关部门 (用√勾选相关部门)

Construction Dept. 校园建设部	√	Operation Dept. 校园运营部	√	H.R. Dept. 人力资源部	√

Relevant documents 相关文件

No无

Distribution mode (black) **发放方式** (涂黑)

Electronic edition ■ Paper edition □

电子版 ■ 纸版 □

1. Purpose 目的

Lifting is one of the most dangerous maintenece works in GTIIT，developing this procedure is to provide a safe system of work as required by GTIIT

起重作业是校内的重大危险作业之一，为提供一个安全可靠的操作环境，特此制定起重安全程序。

2. Scope 范围

All lifting gear, including: manual hoist, electric hoist, crane, and other accessories such as: wire sling, webbing sling, chain, hook, and shackle etc. all lifting equipment and machines used in GTIIT

此程序适用于校内所有起重设备，包括各种手动、电动葫芦、吊车，及各种辅助吊具如：钢丝绳、扁平吊装带、链条、滑轮、吊钩、吊环、支架及吊装扁担等。

3. Responsibility 职责

Lifting contractor company 起重作业的承包商公司：

- Fully responsible to ensure that the requirements of this Lifting Safety Management Procedure are fulfilled.
  完全负责起重作业安全及管理程序的要求及落实。
- Responsible to select and assign capable lifting experts to get training, and manage the performance of the lifting experts in the project execution
  负责选择、委派有能力的吊装专业人士获取培训，并在项目执行阶段监督管理其工作情况。
- Full responsibility in technical and safety management of all lifting works, including legal responsibility of the complete lifting operation process that includes but not limited to qualified workers, lifting device inspection, pre-lifting planning/scheduling, lifting execution, and lifting evaluation etc.
  负责起重作业技术和安全管理上全面责任，包括整个起重作业流程的法律责任，该流程包括但不限于合格工人、吊装器具的检查、吊装前的计划和安排、起重作业的执行、及起重作业的评估等。

Lifting Caretaker 起重作业负责人：

- Responsible for preparing all necessary lifting plans, developing safe work methods, plans and calculations for lifting.
  负责起草所有起重方案、开发吊装操作的安全工作方法、方案及其计算书。
- It is also monitoring all lifting operations to ensure that all lifts are performed in accordance with normal safe lifting construction.
  还负责监督所有吊装作业，确保所有的起重按照正常的安全起重作业程序进行。
- Ensure that all qualified lifting equipment and accessories must be registered before use.
  确保所有合格的起重设备及配件在使用前都必须登记在案。
- Make sure that all lifting equipment and accessories are inspected before use and that they are in good condition.
  确保所有起重设备及其配件使用前，均进行外观检查，并确定状态良好。
- Any pieces of equipment found to be damaged must be withdrawn from service.
  一旦发现设备有任何损坏，停止该设备的使用，或者停止起重作业的进行。

Campus Cconstruction Department校园建设部：

- Responsible for the preparation and implementation of measures for the hoisting management plan of relevant construction projects of campus;
  负责学校内相关施工项目的吊装管理方案的编制和措施的落实；
- Responsible for managing the lifting operations during the construction of various projects in the school, supervising and inspecting the management defects and equipment hardware problems in the work
  负责管理对校内各类项目施工期间的吊装作业，监督检查工作中存在的管理缺陷和设备硬件的问题；
- Promptly correct the lack of security or loopholes in the project.
  及时对项目中存在的安防缺失或漏洞给与及时纠偏。

Campus Operation and Logistics Department 校园运营及后勤部：

- Responsible for the preparation and implementation of measures for daily operation related hoisting management plans in campus;

负责学校内日常运营相关吊装管理方案的编制和措施落实；

- Correct the management defects and equipment hardware problems in the daily operation of the school during the daily operation, supervision, and inspection;
  及时对校内日常运营期间的吊装作业，监督检查工作中存在的管理缺陷和设备硬件的问题进行纠正；

Campus EHS office 校园安全办公室：

- Assist relevant departments to formulate safety management guidelines for hoisting operations in schools, and supervise the effective implementation of the system;
  协助相关部门制定校内吊装作业安全管理指引，并监督该制度的有效落实；
- Provide lifting work permit related training material.
  提供吊装施工许可相应的培训材料和培训信息。
- Correct the unsafe behavior and management defects in time.
  及时对存在的不安全行为和管理缺陷进行纠偏;

4. Terminology and definition 术语及定义

Lifting 吊装作业：

Lifting in this procedure is defined as the act or process of raising, lowering or positioning equipment, materials, or components with a lifting device in order to move the item from one elevation to any other elevation, or to move it horizontally in operation process, maintenance process or construction process in the operation area and project construction area within the school.
是指在学校内运营区域和项目施工区域，对进行检修、维修或施工过程中，利用各种吊装机具将设备、材料或部件提升、降低或定位以将其从一个标高移到另一标高的操作过程。

Trial lifting 试吊：

Trial lifting is defined as to check all positions operation, work-piece security, angles, and their strength performance when lift the work-piece just clear of the ground or away from supports at appropriate distance (normally, it is 100mm ~ 200mm) and keep it 3~5 minutes prior formal lifting.
试吊是指正式吊装前，起升工件，使工件刚刚离开地面或离开支撑适当距离时（通常为100 mm ~ 300mm），并悬停3~5分钟，检查各部位的运行、工件安全、角度、及受力情况。

Rigging 索具：

Rigging is defined as the hardware or equipment used to safely attach a work-piece to a device in order to move the work-piece. It may include simple tie-down ropes, specialized equipment for handling work-pieces such as lifting beams and spreader bars, load-rated wire ropes and slings, tools such as shackles with pins, pulley block, and special materials. Slings may include wire ropes, chains, synthetic web, and metal mesh made into forms.

索具是指：用来将工件安全地附着于某个设施来移动工件的器具或设备，包括简单的捆扎绳、用来装卸工件的特定设备如：吊臂（吊装梁）和支撑横担、有额定负荷的钢绳（钢丝绳）和吊索、卡扣、滑轮组和特殊材料等。

吊索可包括：钢丝绳、链条、合成网和由钢丝网制作的模型等。

Lifting device 吊装器具：

Lifting Device is defined as any machine or device that used to lift a work-piece from its supporting surface. Such devices include, but are not limited to: crane, hoist, hoisting system, chain hoist, come-along, jack, jacking system, gin pole, derrick, monorail hoist, gantry crane, levers, pulley system, air bag jack, strand lift system, etc.

吊装器具是指为任何提升工件离开其支撑面的机械或设备。

这样的设备包括但不仅限于：吊车、手动/电动葫芦、提升机系统、手动/电动葫芦、起重架、杠杆、滑轮系统、钢绞线提升系统等。

Tagline 溜绳：

Tagline means a soft rope (usually fiber) attached to a lifted work-piece suspended from a hook for steadying or guidance purposes of controlling load spinning and pendulum motions by rigger during load lifting operations (lifting, moving, and lowering).

In generally, two taglines fixing on the load are in use. The specific number of equipment needs to be selected according to the actual requirements to increase the fixed position and quantity.

溜绳是指一根（通常为纤维材料）连接到使用被吊钩悬挂的工件的软绳，在起重作业过程中（起升，移动和下降），保证工件的稳定性或者在起重工控制工件旋转和摆动的过程中起到导向作用。

配备两根固定在载荷两边配合使用属于最低标准，具体配备数量需要根据实际要求而选择固定位置和数量的增加。

Payload weight 有效荷载重量：

Payload Weight in this procedure is defined as the total weight of the item to be lifted. Payload Weight includes the actual item weight, plus the weight of attachments, saddles, temporary supports, rigging, hook block components, etc.

Payload weight does not include rigging weight.

有效载荷重量是指被吊起物体的总重量。

吊装荷载包括实际物体重量加上附件重量、横担重量、临时支撑重量、索具重量、吊钩组件重量等。

有效载荷重量不包括索具的重量。

5. General Requirement 一般要求

5.1. Lifting Preparation Phase起重作业准备阶段:

Lifting Preparation in this procedure is defined as the period that all preparation works before the hook was attached by any riggings, the activities in this period includes but not limited to:

起重作业准备阶段是指在吊钩系挂任何索具之前的所有准备工作的时期，此期间具体的工作包括但不限于：

1) Method statement preparation.
施工方案准备；
2) All requested Riggings were selected, inspected, and transferred to Lifting Area.
所有需要的索具已经被选择、检查并运到起重作业区域；
3) All requested Lifting Devices were positioned.
所有需要的吊装器具已就位；
4) The area that the crane outriggers to be fully extended are cleaned.
吊车支腿完全伸展的区域已清理干净；
5) Lifting area must be warned by fully barricade.
起重作业区域已采用警示隔离；
6) Safety watchers were assigned if necessary.
可能需要的安全监护已委派；
7) All the necessary certificates of lifting staff and lifting equipment were verified.

所有参与起重作业人员及设备证件的确认。

In developing lifting method statement the following considerations should be addressed:

制定起重方案时，应考虑下列事项：

- Soil conditions and site terrain to verify access for lifting equipment and to ensure stability along the haul path and at location of the lift.
  现场地形和土质情况是否能保证吊车进出并保证拖车沿途和起吊点的稳定性；
- Underground utilities at the lift location to avoid damage to existing utilities and to ensure adequate ground support.
  避免起吊点地下设施被损坏，确保地面有足够的支撑力；
- The location of overhead power lines to ensure required clearances are maintained during lifting operations.
  起重作业地点的高架输电线路在运输和作业期间可保持规定的距离间隔；
- Lift equipment and rigging hardware requirements including the method of removal following execution of the lift.
  起重设备及其配套硬件，包括起重工作完成后的脱离方法；
- Access of haul and lift equipment into and out of the lift area.
  拖运和起重设备时，作业人员的进出通道。

The Lifting Sop or Method Statement for each haul or lift shall include the following elements as a minimum

拖运或吊装的起重方案至少应包括下列要素：

- A list of the crane or hoisting equipment to be used in the work operation.
  工作中所用的吊车和起重设备清单；
- A sketch showing the position and travel path of haul equipment, hoisting equipment, lift crane, tailing crane, initial location of the item to be lifted, and the final “set” position of the lifted item.
  表示拖车位置和行走路线、起重设备位置、吊车位置、遛尾吊车位置、设备放置地点和设备安装点的草图；
- A layout of the work area, including the locations of all obstacles and potential interferences.

工作区域布置图，包括所有障碍和潜在妨碍物的位置；

- Haul and lift path minimum clearances, turning radius, and clearance requirements from existing facilities, utilities, and overhead power lines.
  拖运和起重的路径的最小空间、回转半径、以及与现有设施、物体和架空输电线路的距离间隔要求；
- Definition of the item to be lifted including verified weight and authorized attaching or lifting points.
  起吊件包括：核定重量、批准的附着或起吊点的确认；
- Equipment manufacturer drawings showing component weight, shipping skid weight, designated rigging attachment points, and center of gravity should be attached to the rigging plan.
  设备厂家标有零部件重量、运输拖架重量、指定的起吊点和重心点的图纸应附在起重方案后；
- Actual loading weight tickets should be attached to the rigging plan.
  实际运载重量的票据应附在起重方案后；
- Definition of special soil preparation and crane mat requirements.
  特殊土质和吊车支垫要求；
- A sketch showing the locations of underground utilities that could affect the haul route and/or rigging work operation or that require special clearances or cribbing to perform the work.
  标志拖运线路或起重作业有影响的地下设施的位置、需要特殊清理或加固点的草图；
- A sketch showing the rigging equipment to be used for the rigging operation, including slings, spreader beams, shackles, hooks, and other components in the load chain.
  用于起重作业的起重设备，包括吊索、支撑横担、卡扣、吊钩和其他荷载链部件的草图；
- Calculations used to determine the forces applied to each rigging component must be provided for all heavy lifts. Standard rigging reference charts may be used to determine size and type of the components required.
  重型起重必须有计算每个起重部件受力情况的计算书。标准的起重参考图表可能用来决定部件的大小和型号；

- Load capacity charts and notes for cranes or other equipment used to perform the lift. These shall be posted in the crane and referenced in the rigging plan. It is important that the actual configuration of the crane, including line parting and size, boom and jib length, counterweight size, and load block size are factored into the parameters used to determine lifting capacity.
  起重荷载表和吊车使用说明或其他用于起重的设备。这些应放在吊车上并作为起重方案的参考资料。吊车的实际配置状况包括吊索尺寸、吊臂和延伸臂长度、配重和荷载尺寸都是决定起重量参数的重要因素；
- A description of the communication method to be used by equipment operators and rigging crews during completion of the lift.
  起重作业时，设备操作员和起重队之间的通讯联络方式的描述；
- Special considerations, such as the effects of wind on the ability of crews to safely complete the lift.
  特殊考虑事项，如在刮风时起重作业队是否能安全完成作业。

5.2. Crane Inspection 起重机检查：

- All mobile cranes must be subjected to pre-inspection before enter GTIIT for lifting activity.
  对于所有移动式起重机在进入校园起重作业前须进行检查。
- Only the authorized/nominated Lifting Experts (such as: Campus Cconstruction Department or Campus Operation Department or Campus EHS office authorized personnel) could check the crane according to the inspection form.
  只有授权/指定的吊装专家，如：建设部或学校运营部、或EHS办公室授权人员，可以依据 “附件起重设备检查清单”检查起重机。
- Contractor must inform school management department in charge of lifting one day in advance before the crane coming.
  承包商有责任在吊车进场前一天告知学校负责吊装的管理部门检查事宜。
- Campus management department in charge of lifting will issue the acceptance tag for the crane that past the inspection. The acceptance is valid for 30 calendar days. If the crane will have an annual inspection during the 30 calendar days, the acceptance tag is valid until the day before the annual inspection.

校负责吊装的管理部门对检查合格的起重机登记入册，合格有效期三十日历天(一个月)。对三十日历天内需进行年检的起重机，此合格证有效期至年检到期日前一天。

- If the crane acceptance tag is going to be expired, the contractor shall inform school management department in charge of lifting 1 day in advance, in order to arrange for a re-inspection.
  入场合格证即将过期的起重机，承包商需提前一天告知学校负责吊装的管理部门，以便安排进行复检。

5.2.1. Pre-lift Checks 起重前核查：

- For crane lifting activity, Contractor Lifting Caretaker and lifting Engineer shall complete the checklist.
  起重作业，承包商起重负责人与负责吊装工程师一同完成核查。
- For all crane lifting activity in Critical Lifting category, Contractor Lifting Supervisor, Contractor safety Personnel, the support of rigging crew and equipment's operator(s), lifting Engineer shall complete the Pre-Lift Construction Review & Acceptance Checklist shown in Attachment B prior to executing the lift.
  对于使用吊车起重作业，在实施之前应由承包商起重负责人、承包商安全人员和操作员，与负责吊装工程师的支持下按照附件B的内容完成起重前核查。
- For hoist or manual lifting activity in General lifting category, Contractor Lifting Supervisor, Contractor HSE Personnel, the support of rigging crew and equipment's operator(s), School lifting Engineer shall complete the Pre-Lift Construction Review & Acceptance Checklist shown in Attachment C prior to executing the lift.
  对于关键使用电动或手动葫芦进行的起重作业，在实施之前应由承包商起重负责人、承包商安全人员和操作员，与负责吊装工程师的支持下按照附件C的内容完成起重前核查。

5.2.2. For all lifts, the following pre-lift safety checks shall be performed
所有的起重都应完成下列起重前安全核查：

- Rigging crew and equipment operator(s) has completed the daily crane checklist and all equipment and systems are in a satisfactory condition to perform the lift.

起重作业成员已完成日常例行吊车检查，确保设备和系统处在良好的工作状况；

- lifting and equipment operator(s) shall verify hauling and lifting equipment is set up per the lifting plan.
  起重作业成员应按照起重方案核实拖运和起重设备的支设；
- Contractor lifiting Supervisor shall inspect and verify equipment supplier specified lift points.
  承包商起重负责人应检查并核实设备供货商设定的起吊点；
- Contractor lifiting Supervisor shall inspect equipment for factors that may add to the total weight of the lift, such as too much sundries
  承包商起重负责人应检查设备上有可能引起重量增加的因素，如过多的杂物；
- Contractor lifiting Supervisor shall inspect lifting equipment.
  承包商起重负责人应检查起重设备；
- A pre-lift discussion shall take place between the Lifting operators prior to making the lift. Clear communications among them shall be emphasized and good.
  起重作业前，起重作业成员应确保成员之间的沟通方式畅通无阻；
- The lifting caretaker shall evaluate weather conditions to ensure the lift can be made safely.
  起重作业负责人应评估天气情况能否确保起重安全地进行；
- The lifting caretaker shall inspect all lifting attachments and rigging equipment including lugs, slings, shackles, and spreader beams.
  起重负责人应检查起重器材及附件包括：吊耳、吊索、卡扣、横担梁。
- All rigging must be manufactured, inspected by certified manufactory according to national standard. Certificates and maintenance book shall be documented in case of further verification.
  所有索具必须是专业厂按国家标准规定生产、检验，具备合格证；维护、保养说明书应存档，以便于查阅；
- The rated capacity, manufacture No., manufacture date, and manufactory shall be clearly marked on the rigging.
  在索具的明显处标有额定起重量、生产编号、制造日期、生产厂名。
- The selected riggings shall match the category, environment, and other relevant requirement of the load.

索具应与所吊运物品的种类、环境条件及具体要求相适应；

- Before carry out the lifting construction, inspector shall check all the riggings and make sure that they are all well functions prior to use.
  作业前，应对吊具与索具进行检查，确认各功能正常、完好时，再投入使用。

5.3. **Safety Lifting Requirement 起重安全规定：**

- Commanding person of lifting must be certified. The commanding person of the job shall closely cooperate with the operators by implementation of the defined command signal.
  起重吊装的司索人员必须持证上岗，作业时应与操作人员密切配合，执行规定的指挥信号。
- The operator shall operate in accordance with the signal of the commanding person, when the signal is unclear or wrong; the operator must stop the operation and restart after clarified.
  操作人员应按照司索人员的信号进行作业，当信号不清或错误时，操作人员必须停止操作，待问询清楚后继续执行。
- During crane operation, it is forbidden to stay, work, through the bottom of boom and heavy objects.
  起重机作业时，起重臂和重物下方严禁人员停留、工作或通行。
- It is prohibited to lift heavy object over people.
  重物吊运时，禁止载荷从人头顶上方经过。
- Carrying personnel with a crane is strictly prohibited.
  严禁用起重机载运人员。
- It is prohibited to obliquely hang, obliquely lift, or lift the buried objects, concretionary objects, or other unknown weight objects.
  严禁使用起重机进行斜拉、斜吊和起吊地下埋设或凝固在地面上的重物以及其它不明重量的物体。
- Never leave a load suspended in the air. In case of unexpected failure, measures shall be taken to place heavy objects landing in a safe place, turn off the engine or cut off power after the overhaul.

禁止起吊载荷长时间悬停空中；如果作业中遇突发故障，应采取措施将重物降落到安全地方，并关闭发动机或切断电源后进行检修。

- When it in the sudden power outage, all controllers shall be appropriated to zero, the power switch shall be disconnected, and take measures to lower the weight down to the ground.
  在突然停电时，应立即把所有控制器拨到零位，断开电源总开关，并采取措施使重物降到地面。
- The material for lug production or lugs strengthens plate must have quality insurance documents. No material shall have crack, double skin, mezzanine, and other defects.
  制作吊耳与吊耳加强板的材料必须有质量证明文件，且不得有裂纹、重皮、夹层等缺陷。
- It strictly prohibited operating the outrigger control valve during lifting. Adjust the leg must be proceed without any load, and the arm shall be at the front or behind.
  作业中严禁搬动支腿操纵阀；调整支腿必须在无载荷时进行，并将臂杆转至正前方或正后方。
- When observed legs sinking, crane tilt, ect. Irregularities conditions, load must be lowered down and lifting operation must be stop as well.
  作业中发现支腿下沉、吊车倾斜等不正常现象时，必须放下重物，停止吊装作业。
- It is not allowed to execute lifting constructions during wind speed which is greater than or equal to 10.8m/s (below Posh wind power level 6), thunderstorms, heavy snow and lifting range of visual non-distance environment may not lifting operations.
  风速大于或等于10.8m/s(蒲氏风力6级以下)、雷雨、大雪天气和在吊装范围内视觉不可及距离等环境下,禁止进行起重作业。
- Temporary barricades must be placed around the work area.
  必须在起重作业区周围加设临时围护。

5.3.1. Safety requirement during Lifting 起重作业期间安全要求：

- Lifting operation must strictly follow the lifting plan.
  起重作业严格遵循起重计划实施操作；
- The lifting operators shall pay close attention to critical weights, physical clearances.

作业人员应对注意临界重量、载荷与周边物体的净空距离进行密切观察；

- When lifting load, it shall slow and stable during up and down, pay attention to balance gravity center.
  起吊重物时，升、降、停要缓慢平稳，注意重心平衡；
- When lifting work-piece, protection pad shall be placed at the angle place.
  吊运工件时，棱角处须加衬垫；
- If there is a risk that loss of control of the work-piece could result in the load striking or pinching the worker, then workers cannot place hands on work-pieces or otherwise work near a suspended work-piece.
  如果存在工件失去控制并将导致工件撞到或夹到工人的风险，此时禁止工人将手扶工件或者在悬空工件附近进行作业；
- Never perform work on a suspended work-piece or place any body part under a work-piece before final placement.
  禁止在悬空工件下作业或在工件最终就位前，将身体的任何部分处于工件之下；
- During the operation, you must ensure the use of tagline (Light, soft, isolating rope such as cotton rope, hemp rope, nylon rope, polypropylene rope could be used as tagline. Broken stranded of tagline is not allowed to use. The diameter of tagline shall be Ø10mm ~ Ø30mm. In general, the length of tagline shall be 5m ~ 15m. Additionally, any kinds of knot shall be free from the tagline.)
  作业期间，必须确保使用溜绳（轻质，柔软，绝缘绳索如棉绳，麻绳，尼龙绳，聚丙烯绳可以作为溜绳使用；破损的溜绳禁止使用；溜绳的直径应在10mm~30mm；通常情况下，溜绳长度应为5m~15m；此外，溜绳上不允许有任何结扣现象）；

5.4. Post lift 起重后：

Once the lift has been safely completed and the load has been secured in its final position:
一旦起重安全地完成，并且荷载已固定在最终位置上：

- The rlifting operator shall remove all tag lines, rigging, and temporary barriers.
  起重作业人员应移走所有的溜绳、索具和临时维护；

- Equipment operator(s) shall remove all hauling and lifting equipment from the area (if no longer needed).
  设备操作员应从现场移走拖运和起重设备（如果不再需要）；
- The lifting caretaker shall restore the work area for future construction work.
  起重负责人应为下步施工工作进行场地恢复工作。

6.0 Annex 附件

A. Mobile Crane Entry Inspection Form
   移动式起重机进场验收
B. Pre-lifting Checklist of crane
   流动式起重机起重前检查表
C. Pre-lifting Checklist of hoister
   葫芦起重前检查表