



Hengyi Industries Sdn Bhd  
恒逸实业（文莱）有限公司

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## Civil Engineering Management System



## 土建工程管理制度



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	Civil Engineering Management System 土建工程管理制度				
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## 1 Purpose

### 目的

The System is hereby formulated in order to standardize the maintenance and repair management of buildings, structures, equipment foundation, roads, floors, fire (water) embankment, rainwater ditches, and pipe corridors and supports of the Company, groundbreaking work and the management of stacked objects on the ground.

为了规范公司建筑物、构筑物、设备基础、道路、地坪、防火（水）堤、雨水沟、管廊管架等维护维修管理、破土作业及地面堆放物管理，特制订本制度。

## 2 Scope of Application

### 适用范围

This System applies to all involved departments.

本制度适用于各部门。

## 3 Terms and Definitions

### 术语和定义

3.1 Pipe corridor and support: divided into installation pipe corridor and support and system pipe corridor and support. The installation pipe corridor and support refers to the pipe corridor and support inside a certain installation boundary; the system pipe corridor and support refers to the pipe corridor and support outside each installation boundary.

管廊管架：分为装置管廊管架和系统管廊管架。装置管廊管架是指某一装置界区内的管廊管架；系统管廊管架是指各装置界区外的管廊管架。

3.2 Ground-breaking operations: foundation excavation of buildings and structures, underground pipeline laying, underground cable laying, road and ground cutting and excavation, greening and transplanting, piling, pier erection, ditch excavation, well digging, drilling and blasting are all ground-breaking operations.

破土作业：凡建、构筑物基础开挖、埋设地下管线、敷设埋地电缆、道路和地面切割与开挖、绿化移植、打桩、立墩立杆、开挖沟渠、掘井、钻孔、爆破等均属破土作业。

## 4 Management Responsibilities

### 管理职责

#### 4.1 Specified administrative authority

##### 归口管理部门

4.1.1 The Equipment Management Dept. is the specified administrative authority for the construction and maintenance of civil engineering such as buildings, structures, equipment foundation, roads, floors, fire (water) embankment, rainwater ditches, and pipe corridors and supports of the Company, shall be responsible for the maintenance and construction management of civil engineering construction projects, define the real estate jurisdiction of the civil engineering disciplines of each department, formulate management systems, and supervise the implementation of the systems.

机械动力部为公司所属建筑物、构筑物、设备基础、道路、地坪、防火（水）堤、雨水沟、管廊管架等土建工程施工及维护归口管理部门，负责土建施工项目检修施工管理，界定各部门土建专业实物管辖范围，制订管理制度，并监督制度的执行。

4.1.2 It shall organize and formulate the defect repair scheme for the Company's civil engineering real estate, be responsible for the permission approval of the groundbreaking work within the jurisdiction of the Company, and organize the completion acceptance.

组织制定公司土建实物的缺陷修复方案，负责公司管辖区域范围内破土作业的许可审批，并组织竣工验收。

#### 4.2 Coordinated management departments

##### 协同管理部门

4.2.1 HSE Dept. shall be responsible for the safety and fire supervision and inspection at the construction site, promptly put a stop to all kinds of groundbreaking work behaviors against the rules, assess and punish construction contractors or individuals that cause accidents such as casualties, equipment damage, production shutdown, etc. due to violations of groundbreaking work regulations, and urge the operation department to deal with the potential safety hazards of rainwater open ditch to prevent pollution incidents.

HSE 管理部负责施工现场的安全、消防监督检查工作，及时制止各类违章破土作业行为，对因违反破土作业规定，而造成人员伤亡，设备损坏，生产停工等事故的施工单位或个人进行考核及处罚；督促运行部处理雨水明沟安全隐患，防止污染事件发生。

4.2.2 GM's office is responsible for the management of roads and off-site roads outside the areas under the jurisdiction of the each operation department in the production area, including road patrol inspection, cleaning and housekeeping, maintenance coordination and other management work. It is responsible for implementing the greening policy required for construction and participating in the completion acceptance of civil engineering projects.

总经理办公室负责生产区各运行部所辖区域以外道路、厂外道路管理，包括道路巡检、清扫保洁、维修协调等管理工作。负责落实因施工需要的涉绿政策，参加土建工程项目竣工验收。

4.2.3 Electrical Operation Dept., Instrument Control Dept., Utilities Dept., Port and Storage Department, HSE Dept. and GM's office all participate in the permission countersigning of the groundbreaking work.

电气运行部、仪表控制部、公用工程部、港务储运部、HSE 管理部、总经理办公室参与破土作业许可会签工作。

#### 4.3 Executive departments

##### 执行部门

4.3.1 Each department of the Company is the executive department, responsible for the daily inspection, maintenance and repair of the civil engineering facilities and its accessories managed by the department, ensuring its integrity, and establishing and improving the basic information.

公司各部门为执行部门，负责本部门管理的土建设施及其附件的日常检查和维护维修工作，确保完好，建立并完善基础资料。

4.3.2 Be responsible for reporting the repair plan of the civil facilities of the department, and cooperate with the implementation of the project; Be responsible for the management of project site construction disclosure, quality, safety, progress, settlement quantities, etc. Participate in the completion acceptance of civil engineering projects.

负责申报本部门土建设施的修理计划，并做好项目的实施配合；负责项目现场施工交底、质量、安全、进度、结算工程量等管理；参加土建项目的竣工验收。

4.3.3 It is responsible for issuance of the *Groundbreaking Work Permit* in the jurisdiction of the department.

负责本部门辖区内的破土作业许可证的签发。

### 5 Management Content

#### 管理内容

##### 5.1 Management of buildings, structures and equipment foundations

##### 建筑物、构筑物、设备基础管理

5.1.1 All users shall complete daily maintenance and care of buildings, structures and equipment foundation, carry out regular inspection, and take measures to solve the defects in structure, anti-seismic, anti-corrosion, anti-lightning, rain-proof and other aspects in a timely manner.

各使用部门应做好建筑物、构筑物、设备基础的日常维护和保养，定期进行检查，对结构、抗震、防锈蚀、防雷击、防雨等方面存在的缺陷，要采取措施，及时解决。

5.1.2 Buildings, structures and equipment foundation shall be used in accordance with the design requirements, and additional loads (including bolting and hoisting tools, anchoring



points, equipment or pipes supporting vibration) and any removal or opening are strictly prohibited. Where additional loads, openings or partial dismantling are required due to special circumstances, the specific scheme must be proposed, which can only be carried out if the accounting results meet the relevant regulations.

建筑物、构筑物和设备基础要按设计要求进行使用，严禁增加额外负荷(包括栓挂吊装工具、作锚固点、支撑有振动的设备或管道)和任意拆除或开孔，凡因特殊情况需要增加额外负荷、开孔、部分拆除等，必须提出具体方案，核算结果满足相关规定后方可进行。

5.1.3 Without permission, it is not allowed to dismantle and reconstruct buildings, structures and equipment foundation, and it is not permitted to erect work sheds or construct buildings against the rules in the production area. During the overhaul, if the Construction Contractor needs to temporarily set up work sheds, it must be approved by the department of the project and the Equipment Management Dept before construction. After the overhaul, the work sheds should be dismantled as soon as possible.

未经许可，不准拆除和改建建筑物、构筑物和设备基础等设施；不准在生产区域内私自搭棚或建设违章建筑，大修期间施工单位临时搭设工棚需经项目所在部门和机械动力部同意后才可搭设，大修结束后，尽快拆除工棚。

## 5.2 Management of roads and floors

### 道路、地坪管理

5.2.1 Roads must meet the requirements for safe passage of transport vehicles and pedestrians. Vehicles are strictly prohibited from overrun and overloaded. No debris shall be piled up in the road against the rules. For unowned or abandoned buildings or domestic garbage piled up in the road, on both sides of the road and on the subgrade slope, the road possessor shall be responsible for cleaning up.

道路必须满足运输车辆、行人的安全通行，严禁车辆超限、超载行驶。道路内不得违章堆放杂物，对于堆放在道路上、道路两侧及路基边坡无主或被遗弃的建筑或生活垃圾，由道路所属部门组织清理。

5.2.2 The road surface (including subgrade slope) shall be smooth, free from serious cracks, obvious potholes and stone debris, and the road shoulders, roadside ditches, roadside guardrails, roadside markers, etc. shall be kept intact. In case of damage, the road departments shall promptly organize repair.

道路路面（包括路基边坡）要求平整、无严重裂缝、无明显坑洞、无块石杂物等，道路的路肩、路边沟、路边护栏、路边标志物等要保持完好无损，若出现损坏，道路所属部门应及时组织修复。

5.2.3 When the roads in the production area need to be broken due to construction, the Construction Contractor shall prepare a construction scheme, and the road groundbreaking work can be carried out only after consent with the road possessor and approval of the Equipment Management Dept.

生产区域内道路因施工需要破土时，施工单位须编制施工方案，经道路所属部门同意，报机械动力部批准后方可进行道路破土作业。

5.2.4 Roadblocks and night warning lights shall be provided during road excavation construction, and steel plates complying with strength requirements shall be laid for temporary traffic. If it is needed to occupy the road, the user should go to the HSE Dept. to handle the road-occupying procedures. After the road is broken, it must be restored in time, with a single-layer bidirectional steel mesh applied for reinforced concrete. In the case of quality problems such as subsidence or cracking after restoring, if it is caused by construction reasons, the Construction Contractor shall be ordered to rework; if it is not caused by construction reasons, the road possessor should promptly report to the Equipment Management Dept., which shall lead the relevant departments to formulate preventive and remedial measures.

道路开挖施工期间，应设置路障和夜间警示灯，临时通行应铺设符合强度要求的钢板。需要占道的，应到 HSE 管理部门办理占道手续。道路破土完毕必须及时恢复，钢筋混凝土采用单层双向钢筋网。恢复后若出现沉陷、开裂等质量问题，若是施工原因引起的责令施工单位返工；若非施工原因引起的，道路所属部门应及时向机械动力部反映，由机械动力部牵头相关部门制定防范、补救措施。

5.2.5 For the covers of cable trenches, rainwater (sewage) ditches, networks and communication facilities on the road surface, the asset possessor shall be responsible for daily patrol inspections. If damage is found, temporary warning protection measures should be carried out immediately and repairs should be arranged in time.

道路路面上的电缆沟、雨水（污水）沟、网络、通讯设施等的盖板由资产隶属部门负责日常巡检，发现有损坏应立即设置临时警示防护措施，及时安排进行维修。

### 5.3 Management of fire (water) embankment

#### 防火（水）堤管理

5.3.1 The fire (water) embankment must be built according to the design drawings and relevant regulations, and the shape and position of the embankment shall not be arbitrarily modified.

防火（水）堤必须按设计图纸及有关规定砌筑，堤的形状及位置不得任意修改。

5.3.2 Fire (water) embankment must remain intact. If it is necessary to break the embankment, the embankment-breaking procedures must be handled and approved by the Equipment Management Dept. before construction. It is strictly forbidden to break the embankment without permission.

防火（水）堤必须保持完整，若需破堤，须办理破堤手续，经机械动力部批准后方可施工，未经批准严禁破堤。

5.3.3 If the fire (water) embankment does need to be broken, it should be restored in time after construction completion, and the Equipment Management Dept. should organize the acceptance of the restoration quality.

确需防火（水）堤开缺口施工的，施工结束后应及时恢复，机械动力部组织对恢复质量进行验收。

## 5.4 Management of pipe corridors and supports

### 管廊管架管理

5.4.1 The asset possessor should establish and improve the basic information of the pipe corridors and supports.

资产隶属部门建立并完善管廊管架基础资料。

5.4.2 The pipe corridors and supports and the accessories shall be inspected regularly and recorded. If the pipe corridors and supports are found to be defective, it should be organized and dealt with in time; in the case of abnormalities such as deformation, inclination and damage, the asset possessor of the pipe corridors and supports should perform corresponding emergency treatment and report them to the Equipment Management Dept.

定期巡检管廊管架及其附件，并做好记录。发现管廊管架存在缺陷，应及时组织处理；发生变形、倾斜、破坏等异常时，管廊管架资产隶属部门应作相应的紧急处理并向机械动力部汇报。

5.4.3 The asset possessor shall declare the overhaul and renewal plan of the pipe corridors and supports and the accessories, complete implementation coordination, and participate in the design joint review and completion acceptance.

申报管廊管架及其附件的大修及更新计划，做好实施配合，参加设计会审和竣工验收。

## 5.5 Management of rainwater open ditch

### 雨水明沟管理

5.5.1 The possessor of rainwater open ditch should establish and improve the basic information of rainwater open ditch.

雨水明沟所属部门建立并完善雨水明沟基础资料。

5.5.2 Ensure that open rainwater ditches and their accessories are in good condition and operate safely. Conduct comprehensive inspections of open rainwater gutters on a weekly basis, including cleaning and dredging rainwater gutters, and keep records. General infringements discovered during inspections (such as building structures on open rainwater ditches, passing through construction pipelines or cable trenches, piling garbage, installing sewage, etc.) should be stopped and reported in a timely manner; serious infringements (man-made destruction), serious sewage discharge or garbage accumulation, etc.) report to the mechanical power department in a timely manner. 保证雨水明沟及其附件完好、安全运行。

定期对雨水明沟进行全面检查，包括对雨水沟的清扫、疏通，并作好记录。对巡检中发现的一般侵害行为(如雨水明沟上修建建(构)筑物、施工管道或电缆沟穿过、堆放垃圾、装置排污等)应及时制止并上报；对严重侵害行为(人为破坏、严重排污或垃圾堆放等)及时汇报机械动力部。

5.5.3 The asset possessor shall declare the overhaul plan of the rainwater open ditch and its accessories under its jurisdiction, complete implementation coordination, and participate in the design joint review and completion acceptance.

负责申报所辖雨水明沟及其附件的大修计划，做好实施配合，参加设计会审和竣工验收。



## 5.6 Management of groundbreaking work

### 破土作业管理

#### 5.6.1 Work permission requirements

##### 作业许可要求

5.6.1.1 Prior to construction of the groundbreaking work, the *Groundbreaking Work Permit* shall be handled. The *Groundbreaking Work Permit* shall be submitted by the Construction Contractor, examined by the department leader of the construction area, countersigned by the relevant department and approved by the Equipment Management Dept.

破土作业施工前应办理《破土作业许可证》，破土作业许可证由施工单位提出申请，经施工区域所在部门领导审批，相关部门会签，机械动力部批准。

5.6.1.2 The countersigning department shall submit specific requirements to the Construction Contractor according to the geological, hydrological, buried pipeline, buried cable, buried optical cable, and survey marking stake conditions in the construction area.

会签部门应根据施工区域地质、水文、埋地管道、埋地电缆、埋地光缆、测量标桩等情况向施工单位提出具体要求。

5.6.1.3 In case of major emergency or other special reasons, the department in the construction area shall organize relevant departments to confirm the safety of the groundbreaking work on site. Thereafter, the Equipment Management Dept. can directly sign and approve the groundbreaking work.

若遇重大紧急情况或其它特殊原因，由施工区域所在部门组织相关部门现场确认破土作业安全，机械动力部在确认破土作业安全后可直接签批破土作业。

5.6.1.4 The *Groundbreaking Work Permit* is valid for up to 10 days each validity period. It can be postponed twice; after that, the *Permit* is required to be re-applied. If it is necessary to handle the extension of the groundbreaking work time, the Construction Contractor must go to the department in the construction area and the Equipment Management Dept. to go through the procedures with the original *Groundbreaking Work Permit*.

《破土作业许可证》有效期：每次最长不超过 10 天。可延期二次，超过二次需重新办理破土作业许可证。办理延长破土作业时间，施工单位须持原《破土作业许可证》到施工区域所在部门和机械动力部办理手续。

#### 5.6.2 Construction management requirements

##### 施工管理要求

5.6.2.1 The Construction Contractor on groundbreaking shall clarify the person in charge of the site safety, be fully responsible for the construction safety, and set up a special person for safety supervision. Before the groundbreaking construction, the review opinions of the

countersigning departments shall be implemented one by one.

破土施工单位应明确现场安全负责人，对施工安全全面负责，并设专人进行安全监护。破土施工前，并逐条落实会签部门的审核意见。

5.6.2.2 During the groundbreaking construction, if the excavation of underground passages affects the ground safety or ground activities affect the safety of the basement, the construction site should be set up with fences and warning signs, and warning lights should be set up at night. If it is necessary to block the road, it shall handle the road-blocking procedures with the HSE Dept.

破土施工期间，应在施工现场设置围栏及警告牌，夜间设置警示灯，如挖地下通道而影响地上安全或地面活动影响地下室安全时，如需堵路时应到 HSE 管理部门办理堵路手续。

5.6.2.3 If the Construction Contractor needs to be conduct construction in pits, ditches, troughs, wells and tunnels, the safety management regulations for entering restricted spaces should be strictly enforced to ensure the safety of the operators.

施工单位如需在坑、沟、槽、井、地道内施工，应严格执行进入受限空间作业安全管理规定，确保作业人员安全。

5.6.2.4 Landslides and collapses should be prevented during groundbreaking excavation. Ground and underground drainage should be completed before groundbreaking excavation. During the excavation process, it should be excavated layer by layer from top to bottom, and it is strictly forbidden to use methods of footing hollowing and holes digging. For groundbreaking excavation, observations on sinking and deformation of adjacent buildings (structures), roads and pipelines should be strengthened. For groundbreaking work in rainy seasons, it is necessary to check whether the earthwork slope has cracks, soil falling, support looseness, deformation, etc.

在破土开挖过程中应防止滑坡和塌方。在破土开挖前，应先做好地面和地下排水。开挖过程中应由上至下逐层挖掘，严禁采用挖空底脚和挖洞的方法。破土开挖应加强对邻近建（构）筑物、道路、管道等下沉和变形进行观测。雨期破土作业应重点检查土方边坡是否存在裂纹、落土、支撑松动、变形等情况。

5.6.2.5 In any of the following circumstances, the Construction Contractor shall report the department in the construction area, and the construction may be carried out after approval. 有下列情形之一的，施工单位应报告施工区域所属部门并经审批同意后方可进行。

(1) Roads, pipelines, electricity, communications and other facilities may be damaged; 可能损坏道路、管线、电力、通讯等设施的；

(2) Temporary water supply cut, power outage and interruption of road traffic are required; 需要临时停水、停电、中断道路交通的；

5.6.2.6 During the groundbreaking construction, in the case of the landslide, collapse or other dangerous situation, the Construction Contractor must immediately stop the work and report to the relevant departments. The construction is prohibited before the dangerous case is eliminated, and the following measures should be taken:

破土施工过程中，出现滑坡、塌方或其它险情，施工单位必须立即停止作业并报告相关部门，

险情排除前禁止施工，并采取如下措施：

(1) Evacuate the operators;

撤出作业人员；

(2) Hang out warning signs and night warning lights;

挂出警告牌、夜间警示灯；

(3) Mark out the warning zone and arrange personnel to be on duty.

划出警戒区，安排人员值勤。

5.6.2.7 In the process of groundbreaking construction, if any unidentifiable object is found, the Construction Contractor shall immediately stop the work, do not knock or move the object, and report the Equipment Management Dept. Construction can be carried out until the situation is identified and effective measures are taken.

破土施工过程中，发现不能辨认的物体，施工单位应立即停止作业，不得敲击、移动，并报告机械动力部，待查明情况并采取有效措施后，方可继续施工。

5.6.2.8 For all kinds of works against the rules at the groundbreaking work site, the person who discovered this behavior has the right to stop construction. If the on-site personnel do not comply with the dissuasion, it should immediately report to the Equipment Management Dept. or HSE Dept.

对破土作业现场的各类违章作业，发现人员有权制止施工，对于不听劝阻的立即报告机械动力部或 HSE 管理部处理。

## 5.7 Foundation settlement observation management

### 基础沉降观测管理

5.7.1 By analyzing the observation data of foundation settlement, the possible unfavorable situation is predicted to ensure the safety and stability of equipment foundation during production and operation; Ensure the safety and stability of equipment foundation within the scope of work influence during civil excavation and related maintenance construction; For areas with special geological conditions, master the consolidation of foundation soil and predict the residual settlement.

通过对基础沉降观测数据进行分析，对可能出现的不利情况进行预测，确保生产运行期间设备基础的安全和稳定；在土建开挖及相关检修施工时，确保工作影响范围内设备基础的安全与稳定；对地质特殊情况的区域，掌握地基土固结情况，预测残余沉降。

5.7.2 Determine the equipment foundation that needs settlement observation. The principle is: important equipment foundations such as storage tanks with a capacity of more than 50,000 vertical tanks, tall buildings and structures, compressors and tall towers, weak positions of foundations and foundations that need settlement observation according to design requirements.

确定需要进行沉降观测的设备基础，原则：5 万立罐容以上储罐、高大建构筑物、压缩机和高大塔器等重要设备基础、基础薄弱位置及设计要求需要进行沉降观测的基础。

5.7.3 Establish a deformation measurement control network consisting of permanent control points and deformation work base points, set up deformation observation points at the positions where the foundation is easy to deform (it has been set up in the construction stage to be used continuously, and the damaged ones have been repaired), and each department will arrange special personnel to maintain the deformation work base points and deformation observation points, which shall not be damaged, and contact professional surveyors for repair. 建立由恒逸永久控制点及变形工作基点构成的变形测量控制网，在基础易变形位置设立变形观测点（施工阶段已经设立可继续使用，已被破坏的安排修复），各部门安排专人对变形工作基点及变形观测点进行维护，不得损坏，因故损坏的联系专业测量人员进行修复。

5.7.4 Regularly arrange professionals to observe the foundation settlement, and the observation frequency is tentatively set at 1/month. If necessary, the observation frequency will be encrypted in case of data discontinuity or large deformation.

定期安排专业人员对基础沉降进行观测，观测频率暂定 1 次/月，必要时即数据不连续性或存在较大变形情况下加密观测次数。

5.7.5 Analyze the settlement observation data in time and report the observation results in time. If the data exceeds the early warning value, issue an early warning in time and notify the Equipment Management Department.

及时对沉降观测数据进行分析，及时上报观测结果，若数据超过预警值，及时发布预警并通知机械动力部。

5.7.6 Submit the settlement observation report regularly, including the current and cumulative settlement and settlement rate, analyze whether the differential settlement value meets the requirements, and draw the cumulative settlement-time process curve and differential settlement-time process curve.

定期提交沉降观测报告，报告内容含本次及累计沉降量及沉降速率，分析差异沉降值是否符合要求，绘制累计沉降量—时间过程曲线，差异沉降—时间过程曲线。

## 6 Inspection and Supervision

### 检查与监督

The Equipment Management Dept. shall manage, supervise, inspect and assess the civil engineering of the operation department.

机械动力部负责对运行部土建工程进行管理、监督、检查和考核。

## 7 Associated Procedures and Records

### 关联程序和记录

#### 7.1 Associated procedures

##### 关联程序



**7.1.1 Approval Procedure for Groundbreaking Work (HYBN-T2-07-0043-2024-2)**

破土作业审批程序 HYBN-T2-07-0043-2024-2

**7.1.2 Maintenance Management Procedures for Buildings, Structures and Equipment Foundation (HYBN-T2-07-0044-2024-2)**

建筑物、构筑物、设备基础维修管理程序 HYBN-T2-07-0044-2024-2

**7.2 Associated records**

关联记录

Groundbreaking Work Permit (HYBN-T6-07-0104-001-2018)

破土作业许可证 HYBN-T6-07-0104-001-2018

**8 Supplementary Rules**

附则

**8.1 This System is under the jurisdiction of Equipment Management Dept.**

本制度由机械动力部归口管理。

**8.2 This System is drafted by Equipment Management Dept.**

本制度起草部门：机械动力部。

**8.3 Equipment Management Dept. is responsible for the interpretation of this System.**

本制度解释权归机械动力部拥有。

**8.4 Revision, preparation and approval of the Regulation are shown in Table 1:**

本制度版本编制和审批情况见表 1:

**Table 1 Revision, preparation and approval of document****表 1 文件版本编制和审批情况**

2	2024-4-1	DongWen Wen 董雯雯	Zhao Tingyun 赵挺云	Xu Ye 徐野	Chen Liancai 陈连财
Revision 版本	Issued date 颁布日期	Prepared by 编制人	Reviewed by 审核人	Authorized by 审定人	Approved by 批准人