Safety Inspection Checklist

For Construction Works

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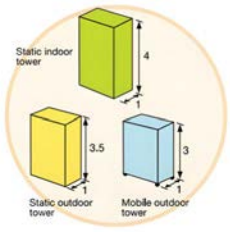
Item No.	Inspection Issues	√	X	Bad	Good
1	**Working at Height / Prevention of Fall from Height**				
1.1*	Openings on building envelope, slab periphery, places and working platforms that present a risk of fall from height for 900mm or more are provided with a top rail of height between 900 – 1150mm,a mid rail at between 450 – 600mm from platform level, 200mm high toe board with brightly coloured safety net. [PRE.B10.1010] Provide top rail, mid rail, toe board with brightly coloured safety net around floor openings.			   	   
1.2	Hop-up platform and step platform are in good working condition. Hop-up platform with a platform height of 900mm or more is provided with guardrails and toe board. [PRE.B8.251]				
1.3*	Slab openings which are not provided with guardrails should be covered by solid and sound materials securely fixed in position with bold letterings indicating the purpose. [PRE.B10.1010]				

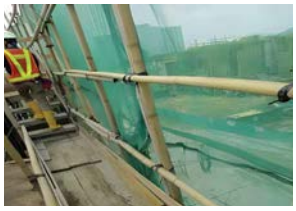
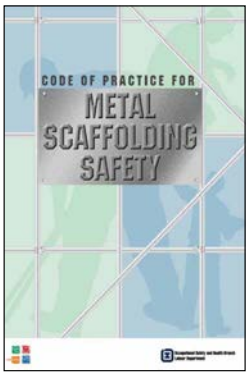
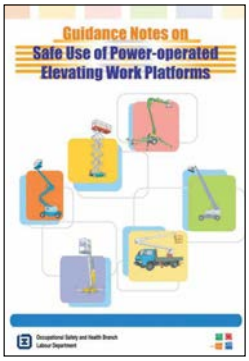
Item No.	Inspection Issues	√	X	Bad	Good
1.4*	Lift shaft openings are installed with 4-leaf metal gate which are locked from outside but openable from inside. Permit-to-work system for entry to lift shaft is adopted. [PRE.B10.1020]				
1.5*	Landing gates to material hoists are locked while in use. The closing of landing gates is monitored by both wireless communication technology (e.g. infrared) and interlocking device. Material hoist cannot operate without closing the gate. [PRE.B8.267(15](c)(i)] The cage of material hoist is fully enclosed. Provision of a camera inside each material hoist cabin, a monitor at control panel and a CCTV system with video recording system at contractor's site office for monitoring operation. [PRE.B10.040]			  	  
1.6*	Openings to temporary refuse chute are locked. [PRE.B10.060]				

Item No.	Inspection Issues	√	X	Bad	Good
1.7*	Workers working off ground must use working platform. If working platform is not considered practically feasible after risk assessment, then workers working at height without a working platform should put on safety harnesses attached to a secured anchor point at high level throughout the work. [PRE.B8.251(1)(d)]				
1.8*	Workers working at height on a mobile elevating work platform should wear safety harnesses attached to a secured anchor point at high level during the work. [PRE.B8.251(2)(f)]				
1.9*	Workers working on suspended working platforms / guided suspended working platform in lift shaft should put on safety harnesses directly attached to an independent lifeline secured to an anchor point without using any extension rope. [PRE.B8.210(9)(c)(ix)]				

Item No.	Inspection Issues	√	X	Bad	Good
1.10*	Workers working near a wall / floor opening and subject to a risk of fall from height for 900mm or more but not provided with working platform should put on safety harnesses attached to a nearby anchor bolt or independent lifeline secured to an anchor bolt. [PRE.B10.1010(4)]			  	  
1.11*	Workers involved in erection, alteration and dismantling of scaffolding or working on truss-out scaffolds should put on safety harnesses attached to an anchor point or an independent lifeline secured to an anchor point. [PRE.B10.810]				 

Item No.	Inspection Issues	√	X	Bad	Good
1.12*	Displaying valid Form on the scaffolding (Form 5 – biweekly), suspended working platform (Form 1 – weekly, Form 2 – half-yearly, Form 3 – yearly), lifting gears (Form 6 – before use & Form 7 – half-yearly), mobile elevating work platform (inspection before use, weekly inspection, periodic inspection, yearly examination and testing), material hoist (Form 1 – weekly, Form 2 – after erection, substantial alteration or repair, Form 3 – half-yearly) and passenger hoist (type examination certificate) for checking. [PRE.B10.040, B10.810]				
1.13	The proportion of height to base dimensions of a mobile working platform should be not less than 1 to 3 (indoor) and 1 to 4 (outdoor). 				
1.14	Secured staircase / ladder with handrails on both sides is provided for access to working platform. [PRE. B8.251(7), PRE. B10.080]				

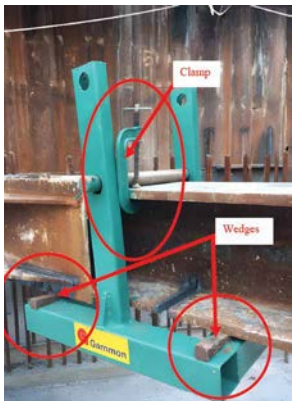
Item No.	Inspection Issues	√	X	Bad	Good
1.15	Ladder is only used for access to different levels but not for working at height. Light duty step platform can be used for work not more than 2m in height. [PRE.B8.251(6)] Ladder for access is fixed at top landing with handrail exceeding 1m from the landing point.			 	 
1.16	All ladders and light duty work platforms used have to conform to international standard. [PRE.B8.251(7)]				
1.17	Railing and toe board are provided on both sides of ramp. [PRE.B10.850(3)]				
1.18	Proper support system for gondola at the roof parapet wall.				
1.19	Permanent staircases are provided with handrails on both sides. [PRE.B10.080]				

Item No.	Inspection Issues	√	X	Bad	Good
1.20*	Using ground releasing shackle for H-pile and sheet pile to eliminate use of man-cage for working at height. Man cage and other means of transport that are used for working at height in other situations need to be approved. [PRE.B8.265(3)]				
1.21	Close-boarding or closely spaced bamboo members to bamboo scaffolding. Metal working platform is fully boarded and avoid tripping of boards. [PRE.B10.880(2)]				 
1.22	Use of metal scaffolding is mandatory. Under special circumstances, Contractors may propose other types of scaffolding with justifications to CM for approval. Professional engineer to design scaffold according to CoP for Metal Scaffolding Safety and submit calculation and drawings to CM for vetting. [PRE.B10.835(3a)(i) & (v)] Develop a safe system of work such as planning, selection, provision and use of mobile elevating work platform. [Construction Sites Safety) Regulation and Guidance Notes on Safe Use of Power-operated Elevating Work Platforms] [PRE.B8.251(11)]				 

Item No.	Inspection Issues	√	X	Bad	Good
1.23*	Authentication of authorised operation of all mobile elevating work platforms and plant by means of digitalised key system. [PRE.B8.267(15)(b)]				
1.24*	Provision of protective frame or smart device as secondary guarding device to prevent the operator of mobile elevating work platform from being trapped between overhead obstruction and the work platform. [PRE.B8.251(11)]				  
1.25	Improper material storage beside window opening creates a fall hazard.				
2	**Protection Against Falling Objects**				
2.1*	Provision of covered walkway / hoarding to avoid accident due to falling objects during work at height., e.g. painting work on façade using gondola. [PRE.B10.710]				

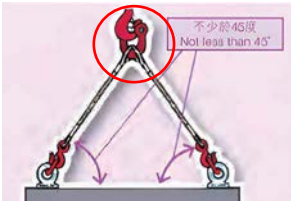
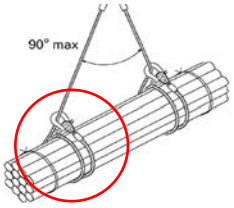
Item No.	Inspection Issues	√	X	Bad	Good
2.2*	Provision of protective canopy, when the seventh floor slabs of domestic blocks have been casted. [PRE.B10.860]				
	The protective canopy should be lowered down unless lifting adjacent to the canopy is being carried out.				
	Provision of catch fans and safety nets for scaffolding. [PRE.B10.950]				
	Remove materials or debris from scaffold and lower dismantled members without leaving them on scaffold. [PRE.B10.835(3d)(ii) & (ix)]				
	Provision of protective net above bending yard				
	Regular clearing debris from metal platform and maintenance.				
2.3	Provision of refuse chutes & regular clearing and maintenance. Covering protruded bars. Refuse chute provided with visual signal system to alert users that the refuse chute is in use. [PRE.B10.060]				

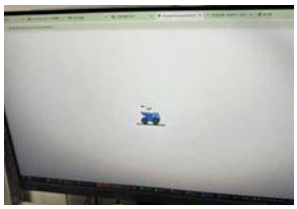
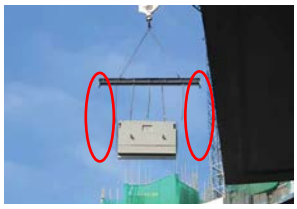
Item No.	Inspection Issues	√	X	Bad	Good
2.4*	Covering up of floor openings or gaps of floor edges and provision of warning sign. [PRE.B10.1010]				
2.5	Clearing debris and loose material from metal formwork and lifting receptacles (e.g., no loose materials in cages and no overflowing skips).			 	 
2.6	Using skips for transporting materials of materials of irregular size. Use all the lifting eyes for lifting of a skip.			 	 
2.7*	Using straps for hand tools when working at height. [PRE.B8.235(10)]				

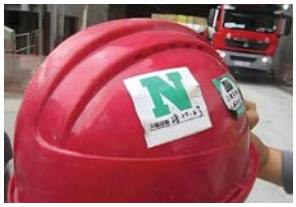
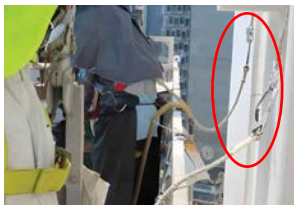
Item No.	Inspection Issues	√	X	Bad	Good
2.8	Materials are placed inside gondola.				
2.9	Clearing debris near building periphery.				
2.10*	[PRE.B8.235 (11) (j)] Using anti-slip gloves by bamboo scaffolders during dismantling.				
2.11	Provide temporary support to prevent free-swinging of the metal strut being cut. [PRE.B10.065(9)]				  

Item No.	Inspection Issues	√	X	Bad	Good
3	**Lifting Operation**				
3.1*	Only competent and qualified operator with valid certification can operate the lifting appliances.				 
3.2*	Valid inspection and examination forms (tower crane (Form 1 – weekly, Form 2 – after erection, Form 3 – before use and every 4 years & Form 5 – yearly), and lifting gear (Form 6 – before use & Form 7 – half-yearly) [PRE.B8.242(9)]				
3.3*	Trained signaller, slinger and lifting supervisor are to be deployed in lifting operation and they need to put on reflective vests. The lifting zone should be fenced off. [PRE.B8.242(2)(h)] [PRE.B8.245(2)(g)] [PRE.B8.295(3)(b)(ii)]				

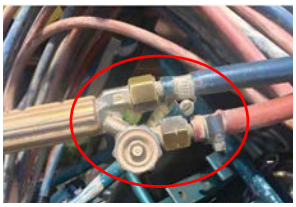
Item No.	Inspection Issues	√	X	Bad	Good
3.4*	The colour code system of all lifting appliances and lifting gear should be accurate and updated.				
3.5	Automatic safe load indicator should be installed with the crane. [PRE.B8.245(1)(a)]				
3.6	All lifting appliances / sling should indicate the maximum safety working load.				
3.7	Preventing lifting appliances from coming into contact with any electrically charged overhead cable or apparatus by the provision of adequate and suitably placed barriers or other means.				
3.8*	The works area of operating lifting appliances is barricaded by fencing. No unauthorised entry to lifting zone is allowed. [PRE.B8.210(2)(g)(iv)]				

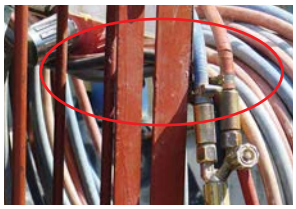
Item No.	Inspection Issues	√	X	Bad	Good
3.9	Proper use of shackle with the pin hung on the lifting hook.				
3.10*	All outriggers are fully extended and rested on pads of suitable material and size not less than 3 times of the float of the outrigger leg. [PRE.B8.245(7)(h)]			 	 
3.11	Double wrap choker hitch of materials before lifting.			 	 
3.12	Provision of visual and audio warning system during lifting operation of tower crane. [PRE.B8.242(13)(c)(v)]				

Item No.	Inspection Issues	√	X	Bad	Good
3.13	Anti-collision system and CCTV system of tower cranes in function. [PRE.B8.210(2)(g)(vi)]				
3.14	Interlock device of lifting hook. [PRE.B8.242(8)(h)]			 	 
3.15	Lifting operation with tagline.				
3.16	All mobile lifting appliances are provided with wireless warning system to prevent unauthorized access to danger zone. [PRE.B8.267(15)(b)]				 

Item No.	Inspection Issues	√	X	Bad	Good
3.17	Remote control of mobile crane by the crane operator outside the danger zone. [PRE.B8.245(7)]				
4	**Personal Protective Equipment**				
4.1*	Workers have properly worn safety shoes and safety helmets with Y-type chin strap and ventilation slots. [PRE.B8.235(1)]				
4.2	Workers have attached the lanyards of their full body harnesses directly onto the fall arrestor on an independent lifeline instead of onto another lanyard. [PRE.B8.251(2)(f)]				
4.3	Workers have worn breathing apparatus / dust masks to prevent inhalation of metal fumes / dust / etc. [PRE.B8.235(6)]				
4.4	Workers have worn goggles to protect their eyes from injury by metal chips/ broken pieces of abrasives during chiseling / drilling rock / cutting / handling corrosive materials / excavation / etc. [PRE.B8.235(4)(h)]				

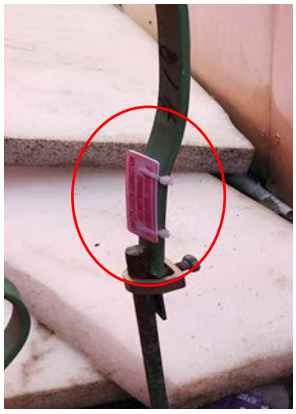
Item No.	Inspection Issues	√	X	Bad	Good
4.5	Workers have worn ear muff / plugs properly to protect their hearing from noisy operation. [PRE.B8.235(4)(h)]				
4.6	Workers have worn suitable protective gloves for protection from electrical shock / corrosives materials / heat / cutting / sharp objects / etc. [PRE.B8.235(11)]				
4.7	Workers working under direct sunlight have worn sunglasses complying with EN166. [PRE.B8.235(4)(h)]				
4.8	Workers have worn anti-heat stress uniform. [PRE.B8.235(3)]				
4.9	Real time monitoring of proper wearing of safety helmet and reflective vest by using artificial intelligence. [PRE.B8.267(15)(d)(iv)]				
4.10	Workers in lifting operation and traffic management have worn reflective vest. [PRE.B8.235(2)(b)]				

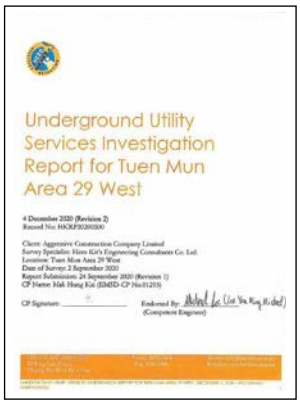
Item No.	Inspection Issues	√	X	Bad	Good
4.11	Personal protective equipment of workers in use is in good condition. The Y-type chin strap is properly worn. [PRE.B8.235(9)] Use of safety harness for fall prevention.			 	 
5	**Gas Welding, Cutting, and Electric Arc Welding**				
5.1	Gas cylinders are properly and securely stored in upright position with proper label.				
5.2	Gas cylinders with pipes and light guns are appropriately installed with flashback arrestors and non-return valve.				
5.3	Gas cylinders currently in use are installed with effective pressure gauges.				

Item No.	Inspection Issues	√	X	Bad	Good
5.4	All hoses are stored properly.			 	
5.5	Fire-fighting equipment and welding shield have been provided for metal welding / cutting process. Do not carry out welding, hot work etc. adjacent to dangerous goods. [PRE.B8.370]			 	  
5.6*	Welding shields are used effectively to prevent spread of welding sparks to surrounding areas. [PRE.B8.370]				
5.7	Provision of protection for eyes (e.g. goggles / shield) and hands (e.g. fire retardant leather gloves) for gas welding / cutting / electric arc welding. [PRE.B8.235(4)(c) & (11)]				

Item No.	Inspection Issues	√	X	Bad	Good
5.8*	Qualified welders with valid certificates attain at least the level of intermediate tradesman and registered as Registered Semi-skilled Worker under the Construction Workers Registration Ordinance to carry out gas welding and cutting process. [PRE.B8.065(11)]				
5.9	All inflammable and disused materials have been removed from the works area with welding and flame cutting process.				
5.10*	Electric arc welding and cutting machines are installed with earth leakage circuit breakers and are properly earthed.			 	 
5.11*	Provision of temporary support to a steel member is made before cutting the steel member by flame cutting.				

Item No.	Inspection Issues	√	X	Bad	Good
6	**Electrical Safety**				
6.1	Weather-proof electrical appliances and water-proof cables with locking cap are used. No exposure of internal wires. Distribution box is provided with cover.			  	  
6.2	Electricity for lighting on site should be of 110V. [PRE.B10.1310(5)(a)]				
6.3	Electrical portable tools should be of 110V and of wireless. [PRE.B10.1310(5)(a)] [PRE.B8.266]			 	 

Item No.	Inspection Issues	√	X	Bad	Good
6.4*	Generator, welding machine should be properly earthed and exposed electrical conductors shall be properly earthed, insulated and covered.				
6.5*	Electrical distribution board should be locked with proper circuit labels and provided with electric shock treatment notice.				 
6.6*	All cables for electrical plants / tools / equipment are properly protected and hung above ground. The cables are in good condition.				
6.7	[COP for the Electricity (Wiring) Regulations 2020 -11G] Provision of warning notice in a conspicuous position at or near the main earthing terminal for store of dangerous goods.				

Item No.	Inspection Issues	√	X	Bad	Good
6.8	Provision of hangers for supporting cables of generator. [PRE.B8.870]				
7	**Excavation Works**				
7.1*	Conduct underground utility services investigation by retrieving record drawings, conducting detection, making trial pits and exposing underground utilities by hand tools, arrange marking of underground utilities and proper protection before commencement of excavation works. Avoid using heavy plant close to utilities. [PRE.B3.060]				
7.2	Provision of timber / metal rigid barrier at the top of all mass excavations / slopes / stockpiles / trenches / pits at of 2m or more in height with warning notice. Provision of mobile metal / plastic rigid barriers at the top of mass excavations / slopes / trenches / pits at or more than 1.2m but less than 2m in height with warning notice. [PRE.B8.210(2)(g)(iv)]				

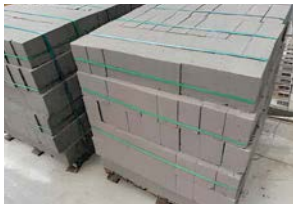
Item No.	Inspection Issues	√	X	Bad	Good
7.3	Provision of climbing access ladder with railing on both sides for trench excavation works. [PRE.B10.080]				
7.4*	Earthmoving plant or excavator is equipped with safety devices such as wireless warning system, rear mirror, sticks fixed at the back of plant, or reversing video device if reversing plant or excavator is not guided by a signaler. a) rear mirror, sticks, reversing video device [PRE.B8.290] b) wireless warning system (Note: Wireless warning system may include artificial intelligence computer vision, internet of things sensing detector, ultrasonic detector, infra-red detector, etc.) [PRE.B8.267(15)(d)(ii)]				 
7.5	No heavy material or load is placed; and no heavy vehicle or plant is placed, within 1.5 m of from the top edge of all mass excavations / slopes / stockpiles / trenches / pits.				

Item No.	Inspection Issues	√	X	Bad	Good
7.6*	Licensed, trained and authorised person to operate the earthmoving plant or excavator. [PRE.B8.267(15(b)] Wireless communication technology (e.g. RFID) is used for identification of authorised operator.				 
7.7	Warning notices are properly and adequately placed. [PRE.B8.210(2)(g)(iv)]				
7.8	Excavations and trenches are adequately shored and updated weekly inspection Form 4 is available.				
7.9	[PRE.B8.2410] Covering exposed slope surfaces in rainy season.				
8	**Storage of Metal Formwork, MiC, Precast Element**				
8.1*	Fencing off lifting zone with adequate warning notice. [PRE.B8.245(6)]				

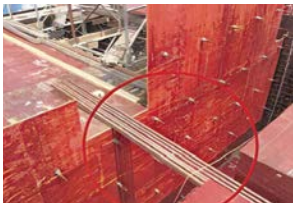
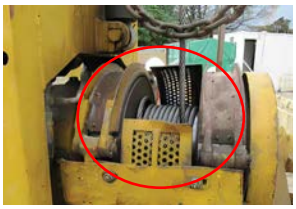
Item No.	Inspection Issues	√	X	Bad	Good
8.2	Storage of metal formwork / MiC / precast element on flat solid ground. [PRE.B8.262]				
8.3	Provision of temporary steel support to prevent from overturning. [PRE.B8.262]			 	 
8.4	Provision of safe access to deck of trucks used in transportation of formwork, MiC and precast element. [PRE.B10.080]				
8.5	Provision of working platform for rigging of lifting formwork, MiC and precast element. [PRE.B8.251]				 

Item No.	Inspection Issues	√	X	Bad	Good
8.6	Storage of bolts and nuts in steel containers with covers and locking devices. [PRE.B8.262(1)(e)] Storage of long bolt and shaft in steel containers of adequate height. [PRE.B8.262(1)(f)]			  	  
9	**Reinforcement Fixing**				
9.1	Safety training for manual handling is provided. [PRE.B8.210(5)]				
9.2	All reinforcement should be stocked safely.				

Item No.	Inspection Issues	√	X	Bad	Good
9.3*	Checking compliance with submitted method statements with reference to the acknowledged safety plan. [PRE.B8.210(2)]				
9.4	Provision of safe work environment at steel reinforcement fabrication areas and off-site steel reinforcement fabrication yard operated by the Contractor. [PRE.B2.010(13)]				
10	**Housekeeping**				
10.1*	Proper fencing around heavy machinery and works area with warning notices. [PRE.B8.210(2)(g)(iv)]			 	 

Item No.	Inspection Issues	√	X	Bad	Good
10.2*	Provision of safe and unobstructed access and levelled and tidy passageway, e.g. free of muddy from works, and without any object, e.g. no projecting nails on timber or protruded reinforcement bars below 1.8m high along circulation route. All protruded reinforcement bars along passageway are covered. [PRE.B8.252]				
10.3*	Temporary traffic arrangements are properly implemented with separate vehicular and pedestrian accesses. [PRE.B8.290]				
10.4	Store all materials in a secure and orderly manner and not over 2m in height. [PRE.B8.1620]				
10.5	Remove stagnant water regularly. [PRE.B8.1655] Remove waste regularly. [PRE.B8.1920]			 	 

Item No.	Inspection Issues	√	X	Bad	Good
10.6	Store chemical substances at designated areas with warning notices in Chinese and English characters. [PRE.B8.345]				
10.7	Proper labelling to functions of control rod / buttons of plant.				
10.8*	Install an interlocking guarding to rotating part with foot pedal to control and a time switch to isolate power supply after a time interval. [PRE,B8.256] Install an angle indicator to indicate the angle of bending for operation of bar bending machine. Bar benders should keep at a safe distance from the bar bending machine.				  
11	**Others**				
11.1	Provision of proper drinking water facilities and resting areas. [PRE.B8.305]				

Item No.	Inspection Issues	√	X	Bad	Good
11.2	Provision of proper access to working area. [PRE.B10.080]			 	 
11.3*	Properly fencing off lifting zone / danger zone & with warning notice. [PRE.B8.245(6)]				
11.4	Adequate lighting to working area. [PRE.B8.162] Provision of proper access to working area, gondola, tower crane & etc. [PRE.B10.850]			 	 
11.5	Proper guarding to plant and equipment. [PRE.B8.235(5)]			 	 

Item No.	Inspection Issues	√	X	Bad	Good
11.6	Compliance on prohibition of smoking, and provision of fire-fighting appliances in designated smoking area. [PRE.B8.360]			 	  
11.7	Provision of a lock and a tag on the main switch of the escalator so that the escalator can be turned off, locked and tagged by the person-in-charge to set the escalator into stationary condition for workers to work on the escalator. [PRE.BS1.600(8)(f)(v)]				 
11.8*	Provision of vehicular and pedestrian gate system operated by [PRE.B10.740] a) a single action on continuous pressure push type button				
	b) with flashing amber lights				

Item No.	Inspection Issues	√	X	Bad	Good
	c) labelled emergency stop buttons.				
	d) instruction in English and Chinese for use of manual release device of the gate system adjacent to the drive unit of the gates.				
	e) a sign to alert existence of the gate system.				
	f) a mark on ground or wall to alert pedestrians of gate operation at vehicular ingress / egress for traffic control.				
11.9*	Disconnection of air hose from air compressor or locking the handle of the valve by locking device when the air hose was not being in use. [PRE.B8.291]				  

Safety Inspection Checklist

For Construction Works

Smart Site Safety System (4S) and Wireless Communication Technologies Implementation INSPECTION CHECKLIST

Content

Item No.	Inspection Issues
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3.	Authenticating Authorised Operation of Plant and Equipment
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5.	Alerting Against Unsafe Acts or Dangerous Conditions for Tower Crane Lifting Zone
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7.	Safety Monitoring System using Artificial intelligence (AI)
8.	Digitalised Tracking System for Information of Personnel, Plant and Equipment
9.	Smart Monitoring Devices for Workers and Contractor's Superintendent
10.	Confined Space Monitoring System
11.	Digitalised Permit-to-Work System
12.	Virtual Reality (VR) for Safety Training
13.	Sensor and Alert System to Detect the Proper Application of Handbrake for Site Vehicles

Contract No. : _____

Title of Contract : _____

Contractor : _____

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
1.	**Provision of 4S**			
1.1	Submit implementation plan of 4S within 14 days from date for commencement for approval by CM, and update the plan monthly. Implement 4S within 1 month from the acceptance of the first implementation plan. [PRE.B8.267.C(2) & (3)] [PRE.C9.294.C(2) & (3)]			
1.2	Provide more than one telecommunication network to suit the 4S components and ensure real-time data transmission. [PRE.B8.267.C(7)] [PRE.C9.294.C(7)]			
1.3	Maintain accuracy of not less than 90% in detecting conditions for triggering alert / warning signal. The video cameras shall continuously transmit encrypted video signal to a CMP for viewing by the CM. [PRE.B8.267.C(8)] [PRE.C9.294.C(8)]			
1.4	Provide system maintenance within 24 hours upon reporting of system abnormality. [PRE.B8.267.C(10)] [PRE.C9.294.C(10)]			
1.5	Assign competent personnel to ascertain the proper functioning of the 4S components before commencement of works each day. [PRE.B8.267.C(12)] [PRE.C9.294.C(12)]			
1.6	Provide training to site personnel involved in the use of 4S. [PRE.B8.267.C(13)] [PRE.C9.294.C(13)]			
1.7	Submit monthly report on implementation of the 4S components to the CM before the monthly site safety committee meeting. [PRE.B8.267.C(14)] [PRE.C9.294.C(14)]			

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
2.	**Centralised Management Platform (CMP)** [PRE.B8.267.C(15)(a)(i) to (xii)] [PRE.C9.294.C(15)(a)(i) to (xii)]			
2.1	Provide and operate a Centralised Management Platform			
2.2	Assign a trained superintendent to oversee the CMP.			
2.3	Ensure uninterrupted operation of the CMP.			
2.4	Develop a CMP dashboard to display data from 4S components on monitors and allow concurrent access by not less than 30 users.			
2.5	The CMP shall support real-time data and video streaming from the safety monitoring system using artificial intelligence.			
2.6	Develop a CMP dashboard and provide training for designated contractor's superintendent on operating the CMP.			
2.7	Provide the access policy of the CMP.			
2.8	Establish a filing system for storage of data for at least 3 months.			
2.9	The CMP and its server shall be fully accessible via a web-browser.			
2.10	CMP servers hosted at site office shall be protected by firewall.			
2.11	CMP servers hosted in data centre or cloud-based system shall meet the industrial security standard. Provide an auditor report for achieving international recognised certification.			
2.12	Secure connection of at least 256-bit Secret Socket Layer shall be used for any network communication, transaction and data feed. [PRE.B8.267.C(15)(a)(xi)] [PRE.C9.294.C(15)(a)(xi)]			
2.13	Conduct IT security audits to ensure the security of CMP. [PRE.B8.267.C(15)(a)(xii)] [PRE.C9.294.C(15)(a)(xii)]			

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
3.	**Authenticating Authorised Operation of Plant and Equipment** [PRE.B8.267.C(15)(b)] [PRE.C9.294.C(15)(b)]			
3.1	Implement a digitalised system on mobile plant and a system with RFID and face recognition technology for material hoists to allow operation by authorised operators only. Prohibit unauthorised duplication of operation keys.			
4.	**Controlling Access to Hazardous Areas by Electronic Lock and Key System** [PRE.B8.267.C(15)(c)(i), (ii) & (iii)] [PRE.C9.294.C(15)(c)(i), (ii) & (iii)]			
4.1	Implement an access control and warning system to prevent unauthorised access to hazardous areas including but not limited to the following –			
	- Entrance to confined space, e.g. basement (e.g. using RFID technology)			
	- Entrance to storage yard of precast concrete elements (e.g. using RFID technology)			
	- Entrance to temporary storage of large panel formwork (e.g. using facial recognition technology)			
	- Lift shaft opening (e.g. using RFID technology)			
	- Floor opening equal to or larger than 500mm x 500mm			
	- Electrical distribution board cabinet			
4.2	The electronic lock shall only be openable by authorised electronic key.			
4.3	In case of unauthorized attempts to open the lock, the system shall issue a siren of at least 70 dB noise level and flashing red light at once.			
4.4	Once a warning is triggered, an alert shall be sent to the mobile devices of the site supervising personnel.			
4.5	The alert includes location of electronic lock being tampered with the date and time of the incident and the electronic key identification number.			

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
5.	**Alerting Against Unsafe Acts or Dangerous Conditions for Tower Crane Lifting Zone** [PRE.B8.267.C(15)(d)(i)] [PRE.C9.294.C(15)(d)(i)]			
5.1	The visual and audio alarm warning system shall cover all loading / unloading danger zone and the danger zone shall be not less than 7m radius from the crane hook.			
5.2	The minimum clearance between the load being lifted and the loading / unloading area triggering the warning shall be not less than 3m from the hook.			
5.3	When the minimum clearance is encroached, a warning light shall flash on plant operating dashboard and a message shall be sent to the crane operator, siren speaker on the crane hook shall turn on with flashing red light.			
5.4	An alert shall be sent to the site supervising personnel and recorded at the Centralised Management Platform.			
5.5	The alert shall show the date and time of the encroachment on the danger zone and the video starts from 15 seconds before the encroachment until 10 seconds after the encroaching person left danger zone.			
6.	**Alerting Against Unsafe Acts or Dangerous Conditions for Mobile Plant Danger Zone** [PRE.B8.267.C(15)(d)(ii) & (iii)] [PRE.C9.294.C(15)(d)(ii) & (iii)]			
6.1	Implement an automated warning system on mobile plant, e.g. use of Internet of Things sensor to detect encroaching persons.			
6.2	The warning system fully cover around the mobile plant danger zone.			
6.3	The danger zones of the mobile plant operation shall be in no case less than 2m from any part of the mobile plant.			
6.4	When the danger zone is encroached, a warning light shall flash on the plant operating dashboard and an alert shall be sent to the plant operator. A siren speaker on the mobile plant shall turn on with flashing red light.			
6.5	An alert shall be generated to the site supervising personnel and be recorded at the Centralised Management Platform for follow-up actions.			
6.6	The alert shall show the date and time of the encroachment on the danger zone and the video starts from 15 seconds before the encroachment until 10 seconds after the encroaching person left danger zone.			

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
6.7	Implement a visual and audio alarm system at site entrance to alert drivers and security guards to stop a mobile plant when it exceeds the height limit. A height of 4.6m should be shown on the sign to comply with the height limit regulated by Transport Department.			
7.	**Safety Monitoring System using Artificial intelligence (AI)** [PRE.B8.267.C 15)(d)(iv)] [PRE.C9.294.C(15)(d)(iv)]			
7.1	Implement an artificial intelligence (AI) system. Maintain the accuracy of at least 90% for real-time monitoring of all unsafe acts or conditions after 4 weeks from the deployment of AI on the site.			
7.2	Provide a total of two on-site technical training courses (4 hours for each course) for implementing the site monitoring system using AI.			
7.3	Videos shall be recorded and analysed to detect unsafe situations –			
	- Unauthorised access to restricted zones, danger zones, lifting zones or vehicular routes (detection zones and alerts should be configurable)			
	- Workers near site vehicles or plant			
	- Potential collisions between workers and site vehicles or plant			
	- Outriggers of mobile crane not being fully stretched			
	- Site personnel not wearing the required personal protective equipment			
	- Heights of lifting in excess of the authorized limits			
	- Workers working at height without wearing safety harness and fixed to a proper anchorage point of lifeline, or without a proper working platform			
	- Monitoring of fatigue, distraction, inattentive behaviours of site vehicles drivers and plant operators during operation of site vehicles and plant.			
7.4	The AI engine shall allow definition of restricted zones, danger zones and lifting zones by users on the screen or by recognition of barriers on the site.			

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
7.5	For unsafe act or condition, siren speaker on the mobile plant and / or at the incident location shall turn on with flashing light and alarm of at least 100 dB.			
7.6	Once a warning siren is triggered, an alert shall be sent to the mobile devices of the site supervising personnel concerned.			
7.7	The alert shall be sent and stored in the Centralised Management Platform. All alerts shall be triggered within 1 second after any unsafe act or condition is detected.			
7.8	The duration of the recorded videos for unsafe acts or conditions shall be 1 minute before and 1 minute after the identified unsafe acts or conditions.			
7.9	The videos, data, alerts and response times shall be sent to the CMP.			
7.10	Record the response time of the follow-up actions triggered by each warning and furnish a summary report to the CM. Conduct a drill every six months.			
8.	**Digitalised Tracking System for Information of Personnel, Plant and Equipment** [PRE.B8.267.C(15)(e)(i), (ii) & (iii)] [PRE.C9.294.C(15)(e)(i), (ii) & (iii)]			
8.1	Implement a digitalised system for real-time online tracking of information of personnel, plant and equipment for retrieving information by mobile device. (e.g. smart tag provided for checking data of acetylene storage cabinet)			
8.2	Set up and update database regularly. (e.g. examination certificate of forklift truck)			
8.3	The mobile device shall display an alert if certificate of site personnel, plant or equipment is outdated or overdue for examination or renewal of certificate.			
8.4	Check and update the information of construction plant such as authorised operators and examination certificate. (e.g. examination certificate of scissor working platform)			
8.5	Check and update the information of workers such as training record and safety performance.			
8.6	Check the data of plant (e.g. bobcat) and equipment through provision of smart tag to facilitate checking by means of mobile applications			

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
9.	**Controlling Access to Hazardous Areas by Electronic Lock and Key System** [PRE.B8.267.C(15)(c)(i), (ii) & (iii)] [PRE.C9.294.C(15)(c)(i), (ii) & (iii)]			
9.1	Based on risk assessment, provide workers and contractor's superintendent in need with smart monitoring devices.			
9.2	Smart devices shall track and record the location of workers and contractor's superintendent and times of working in the CMP.			
9.3	Smart devices shall perform real-time detection of standstill and sending alerts to the CMP.			
9.4	Smart devices shall perform real-time detection of body temperature and heart beat rate and sending alerts to the CMP when thresholds are exceeded.			
9.5	Smart devices shall trigger alerts to workers and contractor's superintendents for unauthorised entry to restricted area.			
9.6	Smart devices have at least 3 voice messages with flashing light to give alert of heat stress, rainstorm and cyclone warning.			
9.7	Allow both battery and wireless charging modes with a minimum battery life of 30 hours per charge under continuous operation.			
9.8	Smart devices shall have wireless connection to cellular, WiFi, NBIoT and/or LoRa networks, or equivalent.			
10.	**Controlling Access to Hazardous Areas by Electronic Lock and Key System** [PRE.B8.267.C(15)(c)(i), (ii) & (iii)] [PRE.C9.294.C(15)(c)(i), (ii) & (iii)]			
10.1	Implement a confined space monitoring system to provide functions below –			
	- Real-time worker counting and location tracking inside confined space			
	- Confined space environment monitoring including oxygen level, temperature, PM2.5 level, carbon monoxide, carbon dioxide, hydrogen sulphide and methane level, combustible gas			
	- Real-time alert if any monitoring parameter exceeds the pre-determined safety levels or any anomaly of workers' conditions is detected			
10.2	All sensors are managed by the Centralised Management Platform.			
10.3	Alerts and response times collected by the system are sent to the Centralised Management Platform.			

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
11.	**Digitalised Permit-to-Work System** [PRE.B8.267.C(15)(h)] [PRE.C9.294.C(15)(h)]			
11.1	Implement a digitalised permit-to-work system for online real-time application, issuance and tracking of permit-to-work / permit to move and operate.			
11.2	The site supervising personnel can access the system using a mobile device			
11.3	The system will send a message through mobile device to alert the site supervising personnel if the permit has expired.			
11.4	The alert from the system shall include details of the permit, date and time of alert.			
11.5	The system shall at least cover high risk activities such as –			
	- work in confined spaces			
	- work in lift shaft			
	- mobile crane, heavy machinery and piling rig			
	- hot work			
	- lifting operation (excluding lifting operation with load not exceeding 2.5 tonnes within a distance of 2.5m from the edge of such crane)			
	- work with electrical hazard			
	- use of ladder for work above ground for work purpose			
12.	**Virtual Reality (VR) for Safety Training** [PRE.B8.267.C(15)(i)(i) & (ii)] [PRE.C9.294.C(15)(i)(i) & (ii)]			
12.1	Adopt VR for safety training of workers in tool box talk.			
12.2	The contents of VR training are related to high risk site activities (e.g. work at height) and workers related to such activities shall be arranged to attend the training.			

Item No.	Inspection Issues	√	X	Remark for "X" (e.g. NA)
13.	**Handbrake Alert System to Detect the Proper Application of Handbrake for Site Vehicles** [PRE.B8.290.B(6)] [PRE.C10.280.B(6)]			
13.1	Provide a sensor and an alert system to detect the proper application of handbrake.			
13.2	If the handbrake is not properly applied when a site vehicle is parked at sloping ground, the senor will trigger an audio alarm and red flashing light in 1 second inside the driving cabin to alert driver before he leaves the vehicle.			
13.3	Warning alert shall be transferred to the Centralised Management Platform.			