

STANDARD INDUSTRI PEMBINAAN

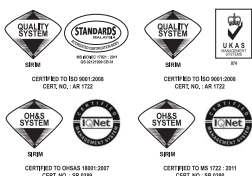
(CONSTRUCTION INDUSTRY STANDARD)

CIS 25:2018

(CONSTRUCTION ACTIVITIES RISK ASSESSMENT [CARA]
Hazard Identification, Risk Analysis and Risk Control [HIRARC])

Description: Construction activity risk assessment, hazard identification, risk assessment and risk control

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**Construction Industry
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**(CONSTRUCTION ACTIVITIES RISK ASSESSMENT [CARA]
Hazard Identification, Risk Analysis and Risk Control
[HIRARC])**

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Hazard Identification, Risk Analysis and Risk Control [HIRARC])

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COMMITTEE REPRESENTATION

This Construction Industry Standard Industry (CIS) was managed and developed by the Construction Industry Development Board Malaysia with the assistance of the Technical Committee of Safety and Health in Construction which comprises representative from the following organizations;

Association of Consultancy Engineering Malaysia (ACEM)

Construction Industry Development Board Malaysia

Department of Occupational Safety and Health (DOSH)

Dewan Bandaraya Kuala Lumpur (DBKL)

IJM Corporation Berhad

Malaysian Society for Occupational Safety & Health (MSOSH)

Master Builder Association Malaysia (MBAM)

National Institute of Occupational Safety & Health (NIOSH)

Pembinaan Mitrajaya Sdn Bhd

Persatuan Pembela Mangsa Kemalangan Industri (PPMKI)

Real Estate & Housing Developers' Association Malaysia (REHDA)

Universiti Malaya (UM)

Universiti Teknologi Mara (UiTM)

PREFACE

This Construction Industry Standard (CIS) hereby referred as CIS 25: 2018 was developed as a Construction Activities Risk Assessment (CARA) using Hazard Identification, Risk Analysis and Risk Control (HIRARC) or in short “CARA - HIRARC” by the Construction Industry Development Board (CIDB) Malaysia which acted as a moderator and facilitator for the technical committee throughout the development process of this standard.

While this CIS 25:2018 on Construction Activities Risk Assessment (CARA) using Hazard Identification, Risk Analysis And Risk Control (HIRARC) adopt several components with reference to Occupational Safety And Health Act and Regulations (OSHA 1994) Safety Management System, ISO 45001:2018; Occupational Safety and Health Management System, MS; 1722: 2011 and others, it is also dependent on new or update information and development concerning this subject area available through this Technical Committee.

Compliance with this Construction Industry Standard does not of itself confer immunity from legal obligations.

CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA) using Hazard Identification, Risk Analysis and Risk Control (HIRARC)

SECTION 1: GENERAL

1.1 Purpose

The purpose of this Construction Activities Risk Assessment (CARA) using Hazard Identification, Risk Analysis and Risk Control (HIRARC) is to establish the minimum requirements and duties for implementing CARA in Malaysia, and provide guidance on its implementation.

The purpose of this CIS is to provide a systematic and objective approach to identify hazard and analyse their associated risks for construction work activities. It is one of the general duties as prescribed under the Occupational Safety and Health Act 1994 (Act 514) for the employer to provide workplaces that free from safety and health risks to their employees and other related person.

1.2 Normative reference

The following normative reference is indispensable for the application of this construction industry standard. For dated reference, only the edition cited applies. For undated references, the latest editions of the normative reference (including any amendments) apply.

- i. Code of Practice How to Manage Work Health and Safety Risks by Safe Work Australia.
- ii. Code of Practice on Workplace Safety and Health (WSH) Risk Management by Workplace Safety and Health Council and Ministry of Manpower, Singapore.
- iii. Construction Industry Development Board Act 1994 and Regulations
- iv. Factories and Machinery (Building Operation and Works of Engineering Construction) (Safety)1986 Regulations
- v. Guidance on Risk Assessment at Work by Health and Safety European Commission Directorate.
- vi. Guideline of Occupational Safety and Health in Construction (Management) 2017 by JKKP & CIDB
- vii. Guidelines for Hazard Identification, Risk Assessment and Risk Control (HIRARC) 2008 by Department of Occupational Safety and Health, Ministry of Human Resources, Malaysia.
- viii. Handbook for Hazard identification, Risk Assessment & Risk Control (HIRARC) by Master Builders Association Malaysia (MBAM)
- ix. Occupational Safety and Health Act (OSHA), 1994 and Regulations
- x. OSH Management System ISO 45001:2018
- xi. OSH Management System MS 1722:2011
- xii. Recommended Practices for Safety and Health Programs in Construction by Occupational Safety and Health Administrator, United State of America
- xiii. Risk Assessment – A Brief Guide to Controlling Risks in the Workplace by Health and Safety Executive, United Kingdom.

1.3 Terms and definitions

- a) Hazard means a source or situation with a potential for harm in terms of human injury or ill health, damage to the environment or a combination of these.
- b) Hazard control means the process of implementing measures to reduce the risk associated with a hazard.
- c) Hierarchy of Control means the established priority order for the types of measures to be used to control risk.
- d) Hazard identification means the identification of undesired events that lead to the materialisation of the hazard and the mechanism by which those undesired events could occur.

- e) Risk means combination of the likelihood of an occurrence of a hazardous event with specified period or in specified circumstance and the severity of injury or damage to the health of people, property, environment or any combination of these caused by the event.
- f) Risk Analysis (RA) means the process of evaluating the risks to safety and health arising from hazards at work.
- g) Risk management (RM) means the total procedure associated with identifying a hazard, assessing the risk, putting in place control measures and reviewing the outcomes
- h) CARA means Construction Activities Risk Assessment
- i) HIRARC means Hazard Identification, Risk Analysis and Risk Control
- j) SHC means Safety and Health Committee of the place of work.
- k) CIS means Construction Industry Standard and with reference to CIS 25: 2018 CARA - HIRARC
- l) Contractor defined by Construction Industry Development Board (CIDB) Act 520, “contractor” means a person who carries out or completes or undertakes to carry out or complete any construction works. Contractor undertakes construction activities to ensure HIRARC is prepared and approved in accordingly.
- m) Consultation means seeking views in decision making and appropriate involvement of staff in: Hazard identification; Risk analysis and determination of controls; Incident investigation; Development and review of the OH&S policies and objectives; Consultation and representation on OH&S matters; Consultation with contractors, when there are changes that affect their OH&S.
- o) HIRARC Team means the primary team that responsible for the overall Risk Analysis activities of the workplace. The respective contractor is responsible to establish and appoint HIRARC Team and members. HIRARC Team shall have a thorough knowledge on conducting Risk Analysis of the selected work activities to be analysed. Composition of HIRARC Team shall be of multi-disciplinary representatives.

1.4 Abbreviation

- i. AC – Administrative Control
- ii. CIDB – Construction Industry Development Board of Malaysia
- iii. DB – Distribution Board
- iv. DOSH – Department of Occupational Safety and Health, Malaysia
- v. EC – Engineering Control
- vi. HOC – Hierarchy of Control
- vii. PC – Personal Protective Equipment Control
- viii. PE – Practising Professional Engineer
- ix. SWL – Safe Working Load

1.5 General Requirement

HIRARC shall be established by contractor and risk control measures shall be implemented before any new work commencement.

1.6 HIRARC flow cart

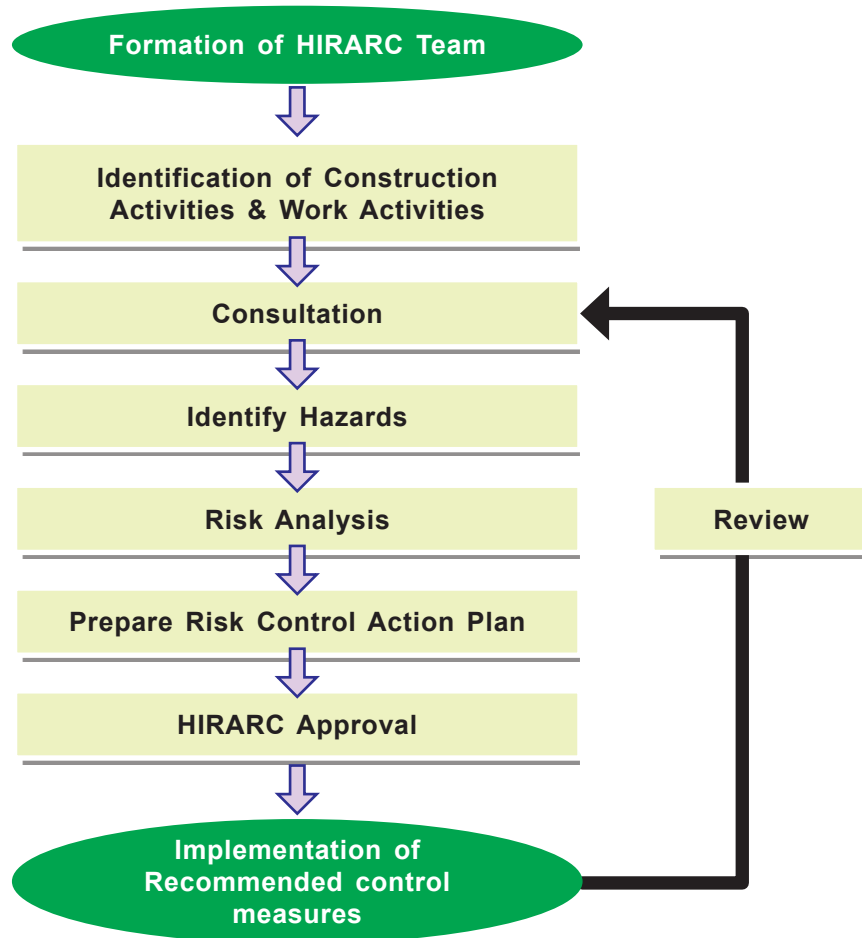
HIRARC flowchart shall comprised from formation of HIRARC team until recommended control measures implemented as in Figure 1.

1.7 Review of HIRARC

HIRARC shall be reviewed whenever:

- change in the risk pattern
- after an incident/accident happened
- change in the work process
- change in legal requirement

Figure 1: HIRARC flowchart



SECTION 2: HAZARD IDENTIFICATION, RISK ANALYSIS AND RISK CONTROL (HIRARC)

The HIRARC Team has to determine the most appropriate way(s) of identifying hazards. These may include brainstorming, systematic process reviews, Job Hazard Analysis (JHA), Job Observations and Job Safety Analysis (JSA). When identifying hazards, the HIRARC Team has to consider if the hazards could cause harm beyond the immediate area of their work.

2.1 Hazard Identification

- a) Select a “Work Activity” from the project works master schedule or “Work Breakdown Structure” (WBS) or project work method statement master list for analysis and all information required has to be documented in HIRARC Form.
- b) Break down work activity into its sub-activities to facilitate the identification of all foreseeable hazards associated with the work. These sub-activities constitute the different steps that make up the work activity.
- c) For each sub-activity, identify the potential hazard(s) and record them in the “Hazard” column. List each hazard in a separate row in the table.
- d) The following categories of hazards should be considered:
 - physical (e.g., fire, noise, ergonomics, heat, radiation);
 - mechanical (e.g., moving and dangerous parts, rotating parts);
 - electrical (e.g., voltage, current, static charge, magnetic fields);
 - chemical (e.g., flammables, toxics, corrosives, reactive materials);
 - biological (e.g., air or blood-borne pathogens, vector-borne disease, virus, bacteria); and
 - psychosocial (e.g., stress, fatigue).

- e) Workplace or Work-related Factors to consider when identifying hazards:
 - proximity of hazardous activities to one another;
 - compatibility of work activities;
 - non-routine work activities and situations; and Environmental conditions

2.2 Risk Analysis

2.2.1 Risk Matrix

This CIS recognises the various risk evaluation methods and matrices practised and preferred by contractor. While this CIS does not restrict workplaces to its choice of matrices, the numeric 5x5 Risk Matrix is recommended. An example is given in Tables 1.

2.2.2 The Matrix recommended by this CIS is as follows:

Table 1: 5x5 Risk Matrix with numeric (quantity) and word (quality) ratings

Likelihood Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (Med)	10 (Med)	15 (High)	20 (High)	25 (High)
Major (4)	4 (Med)	8 (Med)	12 (Med)	16 (High)	20 (High)
Moderate (3)	3 (Low)	6 (Med)	9 (Med)	12 (Med)	15 (High)
Minor (2)	2 (Low)	4 (Med)	6 (Med)	8 (Med)	10 (Med)
Negligible (1)	1 (Low)	2 (Low)	3 (Low)	4 (Med)	5 (Med)

2.2.3 Existing Controls

Existing controls are control measures that are already in place, or required to be implemented to carry out the work activity. Assessment of severity and likelihood should be made on the assumption that existing (or required) controls are in place. Existing (or required) controls that do not influence severity should not be taken into account when assessing severity. Existing (or required) controls that do not influence likelihood should not be taken into account when assessing likelihood. For the purpose of CARA-HIRARC, existing control measures were assumed not available.

2.2.4 Assessment of Severity

Taking the existing risk controls into consideration, the HIRARC Team has to rate the severity of the possible injury or ill-health. When using the 5x5 matrix, the guidance given in Table 2 should be used when selecting the level of severity. When using other matrices, equivalent guidance for severity should be used and described in adequate details for adoption by users of those matrices.

Table 2: A guide to severity rating

Level	Severity	Description
5	Catastrophic	Death, fatal diseases or multiple major injuries.
4	Major	Serious injuries or life-threatening occupational diseases (includes amputations, major fractures, multiple injuries, occupational cancers, acute poisoning, disabilities and deafness).
3	Moderate	Injury or ill-health requiring medical treatment (includes lacerations, burns, sprains, minor fractures, dermatitis and work-related upper limb disorders).
2	Minor	Injury or ill-health requiring first-aid only (includes minor cuts and bruises, irritation, ill-health with temporary discomfort).
1	Negligible	Negligible injury.

Should HIRARC Team have difficulty developing a consensus to the severity level, the Team is to gather more information and/or consult an industry expert.

2.2.5 Assessment of Likelihood

Taking the existing risk controls into consideration, the HIRARC Team has to rate the likelihood the hazard may cause injury or ill-health. When assessing likelihood, the HIRARC Team has to consider personal risk factors - existing medical condition(s) of the person(s) involved in the activity that may affect the likelihood level. When using the 5x5 matrix, the guidance given in Table 3 should be used when selecting the level of likelihood.

Table 3: A guide to likelihood rating

Level	Likelihood	Description
1	Rare	Not expected to occur but still possible.
2	Remote	Not likely to occur under normal circumstances.
3	Occasional	Possible or known to occur.
4	Frequent	Common occurrence.
5	Almost Certain	Continual or repeating experience.

When using other matrices, equivalent guidance for likelihood should be used and described in adequate details for adoption by users of those matrices. Should HIRARC Team members have difficulty developing a consensus to the likelihood level, the Team is to gather more information and/or get advice from an industry expert.

2.2.6 Risk Prioritisation Number (RPN)

The RPN is obtained by multiplying the values of Severity and Likelihood level (Values in the “S” and “L” columns of the HIRARC table), that is, $RPN = S \times L$.

2.2.7 Classification of Risk—Risk Matrix

Compare the RPN against the Risk Matrix in Table 4. Risk controls must be implemented so that the risk levels are not in the red zone (“High Risk”) before work commences. Additional Risk Controls should be implemented till:

- Risk controls for the hazard in the yellow zone (“Medium Risk”) are already As Low As Reasonably Practicable (ALARP); or
- The risk level is in the green zone (“Low Risk”).

Table 4: 5x5 Risk matrix with numeric ratings.

Likelihood Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5	10	15	20	25
Major (4)	4	8	12	16	20
Moderate (3)	3	6	9	12	15
Minor (2)	2	4	6	8	10
Negligible (1)	1	2	3	4	5

Which are the areas within the Matrix to be classified as Low (green), Medium Yellow) and High risks (Red). The categorisation of risk may be done based on, but is not limited to, industry practice, policies of the workplace and risk appetite of the organisation.

2.2.8 Action for Risk Levels

The following actions are to be implemented based on the current risk level.

Table 5: Low, Medium and High Action for Risk Level

Risk level	Risk Acceptability	Recommended Actions
Low	Acceptable	<ul style="list-style-type: none"> • No additional risk control measures may be needed. • Frequent review and monitoring of hazards are required to ensure that the risk level assigned is accurate and does not increase over time.
Risk level	Risk Acceptability	Recommended Actions
Medium	Tolerable	<ul style="list-style-type: none"> • A careful evaluation of the hazards should be carried out to ensure that the risk level is reduced to as low as reasonably practicable (ALARP) within a defined time period. • Interim risk control measures, such as administrative controls or PPE, may be implemented while longer term measures are being established. • Management attention is required.
High	Not acceptable	<ul style="list-style-type: none"> • High Risk level must be reduced to at least Medium Risk before work starts. • There should not be any interim risk control measures. Risk control measures should not be overly dependent on PPE. • If practicable, the hazard should be eliminated before work starts. • Management review is required before work starts.

2.2.9 Risk Evaluation for Health Hazards

Exposure assessments should be conducted to estimate employees' exposure to health hazards where appropriate. Exposures can be estimated by qualitative assessment or quantified by direct measurement. All exposure measurements should be conducted by competent persons using recognised methods, acceptable standard procedures and standard calibrated equipment. Exposure estimates are then compared to established Permissible Exposure Level (PEL) or other health standards to establish the likelihood of the ill-health effects. Based on exposure assessment and risk evaluation, health exposure risks can be ranked to enable prioritisation of action plans to lower these risks. When assessing the risk of health hazards (e.g., noise, chemicals, biological agents and ergonomics), relevant risk factors should be taken into consideration. It is also important to consider other factors which may influence likelihood such as: potential cumulative exposures; potential synergistic effects between certain health hazards (e.g. exposure to excessive noise and trichloroethylene [TCE] will increase likelihood of hearing impairment); or any limitation in health standards if they do not consider all exposure routes. (e.g., potential dermal or ingestion risks are generally not taken into account when setting PELs).

2.3 Risk Control

Selection of risk control measures should be based on the Hierarchy of Control. Elimination of hazard should take precedence, where practicable. Where elimination is not feasible, measures should be

taken to reduce the risk by following the Hierarchy in the recommended order: substitution, isolation, engineering controls, administrative controls and personal protective equipment. For the purpose of this CIS: 25 2018 CARA-HIRARC, the last three hierarchy of control such as Engineering Control (EC), Administrative Control (AC) and Personal Protective Equipment Control (PC) are adopted as the Recommended Control Measures (RCM).

RCM in HIRARC Table of this CIS are the generic good practices and should not be taken as sole mandatory control measures. Contractor should determine their own customized RCM in accordance with the nature of their work activities. There is three most common Personal Protective Equipment's Control (PC) recommended by this CIS i.e. Safety Helmet, Safety Shoes/boots and safety vest for all work activities spelled.

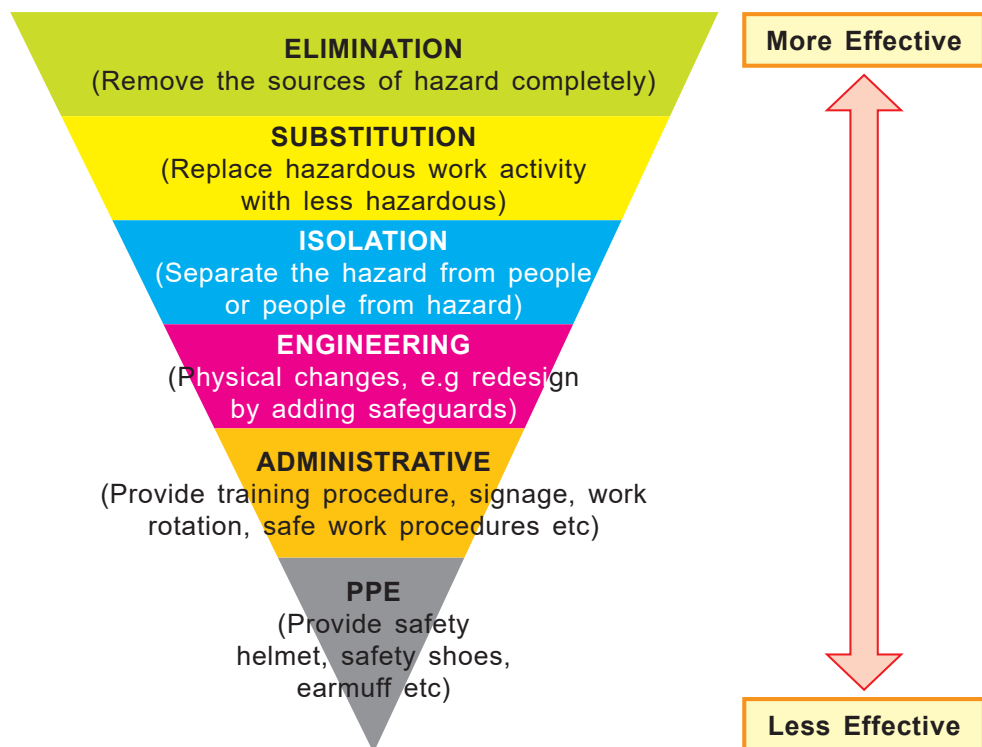
2.3.1 Additional Controls

Check the risk level (or RPN) for acceptability. If the risk level "High" or RPN is in the "High" zone, the risk must be eliminated or reduces to at least a "Medium" level by additional controls. When considering additional controls to reduce risk, control measures that are higher up in the Hierarchy of Control should be considered first.

2.3.2 Hierarchy of Control (HOC)

The control of hazards and reduction of risk can be accomplished by following the hierarchy of Control (see figure 2).

Figure 2: HOC form



A control measure that is higher on the Hierarchy is often more effective as the risk is reduced at or close to the source. The Control measures in the Hierarchy are not to be taken as isolated or single solutions. Generally, it is more effective to use a combination of control measures. For example, engineering controls work better with administrative controls like training and Safe Work Procedures.

SECTION 3: HIRARC Approval

Completed HIRARC table must be approved by the Project/Construction Manager of the contractor of the respective project. As far as is practicable, the contractor has to implement the recommended risk control measures as soon as possible. Contractor must ensure that an action plan is prepared to implement the measures. The plan to include a timeline for implementation and the names of the persons responsible for implementing the safety and health control measure. The contractor must ensure that the plan is monitored regularly until all the measures are implemented. The contractor must ensure that regular inspections and process audits are carried out to make sure that risk control measure have been implemented and are functioning effectively. After the implementation of additional controls, the “Existing Controls” and “Recommended Controls Measures” columns of the HIRARC table have to be updated.

SECTION 4: RECORDS OF HIRARC

The contractor shall ensure that the HIRARC records are kept safe and available at the duration of their project. The contractor needs to ensure that Risk Register is readily available for review by interested party or regulatory agencies.

SECTION 5: RE-EVALUATION WITH ADDITIONAL CONTROLS

When additional control(s) have been decided, re-rate the Severity, Likelihood and Risk Levels (or RPN values) and record them in the “S”, “L” and “RPN” columns in “Risk Control” section of the HIRARC table. The re-evaluated RPN should not be HIGHER than the initial RPN. The revised Risk levels (or RPN values) should preferably be kept within the low Risk (Green) zone, where feasible.

SECTION 6: CONSTRUCTION ACTIVITIES

There are 9 construction activities have been identified for the development of HIRARC under this standard. These 9 construction activities are identified as common activities for the purpose of developing HIRARC for construction project.

The user of this document may include other construction activities which may have potential hazards and suit the construction activities.

The 9 construction activities identified in this standard are as followed:

- Site Preparation Activity (Appendix A)
- Excavation Activity (Appendix B)
- Piling Activity (Appendix C)
- Scaffolding Activity (Appendix D)
- Concreting Activity (Appendix E)
- Structural Steel Activity (Appendix F)
- Demolition Activity (Appendix G)
- Architectural Activity (Appendix H)
- Mechanical and Electrical Activities (Appendix I)

6.1 Work Activities

Work activities have been identified as sub activities under the construction activities. There are 49 work activities have been identified by this standard and the user of this document may include other work activities which may inhere with potential hazards for the work to be performed. Work activities are as listed under the second column of the HIRARC table of common construction work activities in this document.

6.2 Risk Status/Rating after Application of Recommended Control Measures (RCM)

For further understanding on the Risk Status/Rating after Application of Recommended Control Measures (RCM), kindly Refer to **Appendix J**.

DISCLAIMER

CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA – HIRARC) TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

RCM in HIRARC Table of this CIS are the generic good practices and should not be taken as sole mandatory control measures. Contractor should determine their own customized RCM in accordance with the nature of their work activities.

APPENDIX 'A'

CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA – HIRARC) TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis					3. Risk Control		
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
A. SITE PREPARATION WORK									
1	a. Survey Work	Expose to high speed moving vehicle	Struck by high speed vehicle and fatal	No existing risk control measure	2	5	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To install traffic cone and safety warning signage to indicate man at work.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To provide flagman to control traffic flow.</p> <p>ii. Conduct Tool Box Talk on life traffic hazard prior to survey work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/ boots and high visibility safety vest should be made mandatory.</p>
		Expose to sharp protruding object	Potential to sustain legs injury	No existing risk control measure	4	3	12	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no EC possible.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To conduct visual site inspection prior to survey work.</p>

									<p>ii. Conduct Tool Box Talk on potential hazards during survey work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety vest and safety shoes/boots should be made mandatory.</p>
									<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no EC possible.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To consume more clean drinking water.</p> <p>ii. Get frequent short break under shaded area.</p> <p>iii. To organise for work rotation.</p> <p>iv. Conduct Tool Box Talk on extreme temperature hazard.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots and visible long sleeve shirt should be made mandatory.</p>
									<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To install hard barricade to indicate machinery working radius.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To provide and visibly display of safety notices and signage.</p> <p>ii. To engage flagman to</p>

		Expose to hit by fallen trees	Hit and crush by falling tree sustain body injury	No existing risk control measure	3	4	12	YELLOW - Medium	<p>potential bees and hornet nest prior to site clearing.</p> <ul style="list-style-type: none"> ii. Conduct Tool Box Talk on potential hazard during site clearing. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety vest, safety shoes/boots and working jacket should be made mandatory. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Supervisor in-charged to ensure there is no one come too close within the perimeter of tree fallen work area. ii. To erect visibly safety warning signage and notice within the perimeter of tree fallen work area. iii. Conduct Tool Box Talk prior on unloading work safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots and safety vest should be made mandatory. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To provide water bowser to minimize mineral dust spreading. <p>b. ADMINISTRATIVE CONTROL (AC)</p>
Expose to inhalation of mineral dust	Potential to sustain multiple respiratory problems	No existing risk control measure	4	2	8	YELLOW - Medium			

			Exposed to excessive noise	Potential to cause hearing loss	No existing risk control measure	4	2	8	<p align="center">YELLOW - Medium</p>	<ul style="list-style-type: none"> i. To organize for more frequent short break to the welder. ii. Conduct Tool Box Talk on mineral dust hazard prior to site clearing. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety vest, safety shoes/boots and dust mask should be made mandatory. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. Install silencer at the source of noise when the noise level exceeded 85dB. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To organise work rotation. ii. To conduct Tool Box Talk on noise hazard prevention. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety vest, safety shoes and ear plugs should be made mandatory.
	d. Site office preparation- Site cabins	Failure of hoisting tackles during hoisting	Crush by hoisted load and fatal	No existing risk control measure	3	5	15	<p align="center">RED - High</p>	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon hoisting area. ii. To use Tag Line to control load movement if mobile crane is used for site cabins unloading. <p>b. ADMINISTRATIVE CONTROL (AC)</p>	

<p>i. To provide standing supervision during unloading work.</p> <p>ii. Hoisting tackles must be inspected by trained rigger prior usage.</p> <p>iii. Conduct Tool Box Talk prior on hoisting work safety.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots and high visibility safety vest should be made mandatory.</p>							<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To cordon hoisting area.</p> <p>ii. To use Tag Line to control load movement if mobile crane is used for pipes unloading.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To provide standing supervisor during hoisting work.</p> <p>ii. Conduct Tool Box Talk prior on hoisting work safety.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots and high visibility safety vest should be made mandatory.</p>
RED - High							
<p>Hit by moving load</p>	<p>Hit and crush by moving load and fatal</p>	<p>No existing risk control measure</p>	<p>3</p>	<p>5</p>	<p>15</p>		
<p>e. Mobilization of construction machineries</p>	<p>Poor access and egress</p>	<p>Machinery accident and overturned</p>	<p>No existing risk control measure</p>	<p>3</p>	<p>4</p>	<p>12</p>	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To prepare safe designated access</p>
YELLOW - Medium							

CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis					3. Risk Control		
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
B. EXCAVATION WORKS									
1	a. Mechanical excavation	Worker presence within the working radius of excavator	Hit by excavator or back hoe moving arm and bucket and cause Fatal	No existing risk control measure	4	5	20	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon machinery working vicinity. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision by designated person. ii. Excavation work must be carried out by trained personnel. iii. Conduct Tool Box Talk on excavation safety prior to excavation work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety glasses, safety shoes/boots and high visibility safety vest should be made mandatory. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To install guard rail or fencing along excavated area.
		Inadequate protection for public	Public fall into excavated trench and cause serious injury	No existing risk control measure	4	4	16	RED - High	

	Poor shoring	Excavation wall collapse – buried alive/ Fatal	No existing risk control measure	4	5	20	RED - High		
									<ul style="list-style-type: none"> ii. During darkness to provide adequate illumination and warning light. iii. To construct safe temporary foot walks for the public. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide flagman or watchman to warn public of the excavation work. ii. To erect sufficient safety warning signage and notices. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. No applicable to the public. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To provide and maintain adequate and appropriate shoring. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Supervisor to inspect shoring every time prior commencing with excavation work. ii. Shoring design and calculation must be endorsed by Practising Professional Engineer (PE) and periodically inspected. iii. Conduct Tool Box Talk on excavation safety prior to excavation work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety vest and safety shoes/

									boots should be made mandatory. a. ENGINEERING CONTROL (EC) i. To demarked 600mm line along excavation area for easy identification of placing spoils and heavy loads. b. ADMINISTRATIVE CONTROL (AC) i. To provide standing supervision by designated person. ii. Conduct Tool Box Talk on excavation safety prior to excavation work. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety vest and safety shoes/ boots should be made mandatory.
						4	5	20	RED - High
	Spoils or heavy loads are place less than 600mm from excavation edge	Excavation wall collapse – buried alive/ Fatal	No existing risk control measure			4	2	8	YELLOW - Medium
	Poor access and egress into trench	Slip, trip and fall and cause bodily injury	No existing risk control measure			4	2	8	YELLOW - Medium
									a. ENGINEERING CONTROL (EC) i. To provide proper ladder as safe access and egress from such excavation i.e. for 1.2 meter deep and more. b. ADMINISTRATIVE CONTROL (AC) i. To carry out inspection of excavated area by Supervision prior to excavation work commencement. ii. Conduct Tool Box Talk on excavation safety prior to excavation work.

											<p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety vest and safety shoes/boots should be made mandatory.</p>
b. Manual excavation	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10			YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Excavation work must be carried out by trained personnel.</p> <p>ii. To organised work rotation.</p> <p>iii. Conduct Tool Box Talk on excessive manual handling hazard and control prior to manual excavation work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p>	
	Poor access and egress into trench	Slip, trip and fall and cause bodily injury	No existing risk control measure	4	2	8			YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To provide proper ladder as safe access and egress for trench i.e. for 1.2 meter deep and more.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. Conduct Tool Box Talk on hazard of poor excess and egress.</p>	

CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis				3. Risk Control			
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
C. PILING WORKS ACTIVITIES									
1	a. Unloading piling machine from low loader	Failure of access ramps	Machinery overturned and crushed nearby worker/helper (Fatal)	No existing risk control measure	3	5	15	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. The width of ramps for motor trucks or heavier vehicle shall not less than 3.7 metres must be designed and endorsed by Practising Professional Engineer (PE) except the ramps is a part of the low loader.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To conduct visual inspection of ramps by standing supervisor prior unloading.</p> <p>ii. Work must be carried out by trained personnel.</p> <p>iii. Ensure compliances of Safe Work Instruction.</p> <p>iv. To conduct tool box talk prior unloading operation.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety vest</p>

										and safety shoes/ boots, should be made mandatory.
b. Reassembling of piling machine	Exposed to crush by components of piling machine	Potential to cause fatal to Worker/helper	No existing risk control measure	3	5	15	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. Maximize use of mechanical aid such as fork lift and chain block when handling piling machine components during reassembling. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. Ensure compliances of Safe Work Instruction. iii. Work must be carried out by trained personnel. iv. Conduct Tool Box Talk prior to reassembling work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/ boots, safety vest and working gloves should be made mandatory. 		
	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	4	2	8	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work must be carried out by trained personnel. ii. Never lift heavy load alone, seek assistance from other. iii. Conduct Tool Box Talk on manual handling 		

								<ul style="list-style-type: none"> ii. To provide standing supervision. iii. Lashing of pipe spool shall be carried out by trained rigger. iv. Machinery or equipment used for unloading shall be operated by trained operator. v. To carry out safety inspection or working area and machineries prior to unloading and stacking of piles. vi. To conduct Tool Box Talk prior to manoeuvre. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety vest, safety shoes/boots and working gloves should be made mandatory.
	d. Unloading and Stacking of RC Piles	Exposed to hit by moving piles	Potential to be hit or crushed by moving pile and fatal	No existing risk control measure	3	5	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon unloading and stacking vicinity. ii. To use Tag Line to control pile movement if mobile crane is used for pipes unloading. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. Work must be carried out by trained personnel. ii. Conduct Tool Box Talk prior on unloading work safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety

								helmet, safety shoes/ boots, high visibility safety vest and working gloves should be made mandatory.
Exposed to excessive noise	Potential to cause hearing loss	No existing risk control measure	5	3	15	RED - High	a. ENGINEERING CONTROL (EC) i. Ensure engine cover is fully closed. b. ADMINISTRATIVE CONTROL (AC) i. To provide standing supervision. ii. To organise work rotation. iii. Work must be carried out by trained personnel. iv. To conduct Tool Box Talk on noise hazard prevention. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, safety vest and ear plugs or ear muff should be made mandatory.	
Striking unidentified underground utilities	Potential to cause serious bodily injury	No existing risk control measure	5	4	20	RED - High	a. ENGINEERING CONTROL (EC) i. To conduct underground utility mapping prior to pile's striking work. ii. Determining and marking of striking points prior to striking work. b. ADMINISTRATIVE CONTROL (AC) i. To provide standing supervision. ii. Work must be carried out by trained personnel.	

										<p>iii. To conduct Tool Box Talk on striking work safety.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety vest and safety shoes/boots should be made mandatory.</p>
e. Pile striking	Welder exposed to welding arc ultra violet	Potential to cause eyes injury	No existing risk control measure	3	4	12	YELLOW - Medium		<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To implement hot work permit system for welding work.</p> <p>ii. Welding work must be carried out by trained welder.</p> <p>iii. Conduct Tool Box Talk prior to manoeuvre.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet with welding visor, safety shoes/boots, welding gloves, safety vest and working jacket should be made mandatory.</p>	
							RED - High		<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To provide adequate and appropriate localize earth leakage circuit breaker (ELCB) and earthing system.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Welder to conduct inspection on welding machine and</p>	
	Welder exposed to contact with damage insulator of welding cable	Potential to be electrocuted and Fatal	No existing risk control measure	4	5	20				

									<p>accessories prior welding work.</p> <p>ii. Welding cable routing should be kept free from any sharp, heavy objects and damages to avoid injury or damages to the cables.</p> <p>iii. Conduct Tool Box Talk on welding safety prior to welding work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, welding gloves, safety vest and welding jacket should be made mandatory.</p>
f. Pile's joining using arch welding method	Exposed to fire hazard	Potential to cause fire, burn and property damage	No existing risk control measure	4	4	4	16	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To provide portable fire extinguisher within the reach of the welder.</p> <p>ii. To use fire blanket to prevent flying of welding flare.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To implement Hot Work Permit system for welding.</p> <p>ii. To assign Fire Watcher to oversee hot work area.</p> <p>iii. To ensure there are no flammable materials exist within the hot work working zone.</p> <p>iv. To provide standing supervision.</p> <p>v. Conduct Tool Box Talk on fire hazard and</p>

									control prior to hot work. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, welding gloves, safety vest and welding jacket should be made mandatory.
	Exposed to inhaling of toxic gas	Potential to cause multiple respiratory problems	No existing risk control measure	4	3	12	YELLOW - Medium		a. ENGINEERING CONTROL (EC) i. To provide localize exhaust and ventilation system for welding work. b. ADMINISTRATIVE CONTROL (AC) i. To organised work rotation. ii. Work must be carried out by trained personnel. iii. To conduct Tool Box Talk on toxic gas inhalation prevention prior to welding work. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety vest, safety shoes/boots and respirator should be made mandatory.
	Exposed to excessive vibration	Potential to sustain Renaud's syndrome or White finger disease	No existing risk control measure	4	4	16	RED - High		a. ENGINEERING CONTROL (EC) i. To install well-padded handles for pneumatic breaker to minimize vibration to user. b. ADMINISTRATIVE CONTROL (AC) i. Work must be carried out by trained personnel.
	g. Pile cutting using pneumatic breaker								

							<ul style="list-style-type: none"> ii. To provide standing supervision. iii. To organise work rotation. iv. Conduct Tool Box Talk on vibration hazard and control prior to pile cutting work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet with face protection, safety shoes/boots, extra padded working gloves, dust mask and working jacket should be made mandatory.
							<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To provide localize water wetting to minimize mineral dust spreading. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To organize work rotation. ii. Work must be carried out by trained personnel. iii. Conduct Tool Box Talk on mineral dust inhalation prevention prior to welding work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and dust mask should be made mandatory.
							<p>h. Excavation work for pile cap preparation</p>
	Expose to inhalation of mineral dust	Potential to sustain multiple respiratory problems	No existing risk control measure	3	3	9	<p>YELLOW - Medium</p>
	Poor shoring	Excavation wall collapse – buried alive/ Fatal	No existing risk control measure	5	5	25	<p>RED - High</p> <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To provide and maintain adequate and

	<p>i. Pile cap re-bar installation</p>	<p>Exposed to protrude sharp object</p>	<p>Potential to puncture leg and hand and caused injury</p>	<p>No existing risk control measure</p>	<p>4</p>	<p>2</p>	<p>8</p>	<p>YELLOW - Medium</p>	<p>a. ENGINEERING CONTROL (EC) i. To install protection cap for all protruding object. b. ADMINISTRATIVE CONTROL (AC) i. To inspect work area and install protection cap for all protruding sharp object prior to work commencement. ii. Work must be carried out by trained personnel. iii. Conduct Tool Box Talk on puncturing hazard and control prior to pile cap re-bar installation. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p>
	<p>Excessive manual handling</p>	<p>Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)</p>	<p>No existing risk control measure</p>	<p>5</p>	<p>2</p>	<p>10</p>	<p>YELLOW - Medium</p>	<p>a. ENGINEERING CONTROL (EC) i. There is no possible EC. b. ADMINISTRATIVE CONTROL (AC) i. To organise work rotation. ii. Work to be carried out by trained personnel. iii. Never lift heavy load alone, seek assistance from other. iv. Conduct Tool Box Talk on manual handling hazard and control prior to manual handling work.</p>	

<p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p>								
<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To use concrete pump for concrete casting work.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. Conduct Tool Box Talk on concreting safety prior to concrete work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet with face protection, water proof safety boots, water proof working gloves, safety vest and working jacket should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To organise work rotation.</p> <p>ii. Work to be carried out by trained personnel.</p> <p>iii. Never lift heavy load alone, seek assistance from other.</p> <p>iv. Conduct Tool Box Talk on manual handling hazard and control</p>	<p>YELLOW - Medium</p>	<p>10</p>	<p>2</p>	<p>5</p>	<p>No existing risk control measure</p>	<p>Potential to sustain Dermatitis</p>	<p>Expose to contact with wet cement mixture</p>	<p>j. Manual pile cap concrete work</p>
<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To organise work rotation.</p> <p>ii. Work to be carried out by trained personnel.</p> <p>iii. Never lift heavy load alone, seek assistance from other.</p> <p>iv. Conduct Tool Box Talk on manual handling hazard and control</p>	<p>YELLOW - Medium</p>	<p>10</p>	<p>2</p>	<p>5</p>	<p>No existing risk control measure</p>	<p>Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)</p>	<p>Excessive manual handling</p>	

CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis					3. Risk Control		
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
D. SCAFFOLDING WORKS									
1.	a. Unloading scaffold component using fork lift	Unsecured load lifted by forklift	Worker hit or crush by scaffold components and sustain serious bodily injury	No existing risk control measure	4	4	16	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon unloading area. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Load lashing must be carried out by trained rigger. ii. Forklift operator to ensure load are secured before lifting. iii. To provide standing supervision. iv. To conduct Tool Box Talk on unloading safety by forklift prior to unloading work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/ boots, safety vest and working gloves should be made mandatory. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon forklift working area.
		Unsafe forklift access and egress	Forklift overturned and crush worker -Fatal	No existing risk control measure	4	5	20	RED - High	

										<p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. To ensure there is no passenger on the forklift. iii. Forklift is operated by trained operator. iv. Forklift must not be over loaded. v. To conduct Tool Box talk on forklift safety prior to forklift operation. <p>c PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety vest and safety shoes/boots should be made mandatory.
										<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide helper during scaffolds components inspection. ii. Never lift heavy load alone, seek assistance from other. iii. To organise work rotation. iv. To Conduct Tool Box Talk on manual handling hazard and control prior to manual handling work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and
										<p>YELLOW - Medium</p>
										8
										2
										4
									No existing risk control measure	
								Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)		
								Excessive manual handling		
								b. Unloading scaffold components manually		

										working gloves should be made mandatory.
c. Inspection of scaffold components by competent erector	Poor housekeeping	Slip and Fall, trip and fall potential sustain cause bodily injury	No existing risk control measure	4	2	8	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To provide and maintain designated walk way. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To conduct regular house-keeping in the work place. ii. Scaffolds components must be kept orderly and tidy. iii. Work to be carried out by trained personnel. iv. To Conduct Tool Box Talk. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety vest and safety shoes/ boots should be made mandatory. 		
d. Erection and/or alteration of scaffolding	Exposed to fall while working at height	Potential to fall from height and sustain serious bodily injury	No existing risk control measure	5	4	20	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To install horizontal and vertical life line. ii. To install temporary guard rails as an edge protection. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. Employees must be trained to work at height. iii. Conduct Tool Box Talk on working at height hazard and control prior to erection work. 		

												<p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, suitable foot wears, working gloves, safety vest and full body harness should be made mandatory. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. Scaffolds design calculation endorsed by Practicing Professional Engineer (frame type 15m and above and tubular 40m and above). <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Periodical inspection by competent scaffolder. ii. To construct or erection of scaffolding as per approved design drawing. iii. Construction or erection of scaffolding must be performed by competent erectors. iv. Do not used defective scaffolds components. v. To Conduct Tool Box Talk on safe erection and alteration of scaffolding prior to erection work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet and suitable foot wears and highly visibility safety vest should be made mandatory.
												RED - High
					No scaffolds design and calculation drawing	Collapse of scaffolds structure and may cause fatal	No existing risk control measure	5	5	5	25	

		Unsecured scaffolds components and tools	Hit by falling object and may cause head injury	No existing risk control measure	5	4	20	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. Scaffolds components and tools must be secured or lashed. ii. To cordon off the working area to prevent an unauthorised entry. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Do not temporary stored any scaffolding components on any ongoing construction or erection scaffolding. ii. Work must be carried out by competent erectors. iii. Conduct Tool Box Talk on scaffolding erection/alteration safety prior to erection/alteration work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, suitable foot wears, safety vest and working gloves should be made mandatory.
	Poor access and egress	Slip, trip and fall potential to cause serious bodily injury	No existing risk control measure	5	5	4	20	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To provide and maintain scaffolding safe access and egress continuously. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Inspection of access and egress by competent scaffolder one in every seven days or after bad weather.

									<ul style="list-style-type: none"> ii. Access and egress user to inspect access and egress before use. iii. Scaffolding access and egress must be kept free from obstructions or grease. iv. Conduct Tool Box Talk on safety use of scaffolding access and egress. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety suitable foot wears and high visibility safety vest should be made mandatory.
	e. Dismantling of scaffolding	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	4	20	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. Work must be performed by competent erector/dismantler. iii. Never lift heavy load alone, seek assistance from other. iv. Conduct Tool Box Talk on manual handling hazard and control prior to scaffolding dismantling. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, suitable foot wears, safety vest and working gloves should be made mandatory.

		Unsecured scaffolds components and tools	Hit by falling object and may cause head injury	No existing risk control measure	5	2	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. Scaffolds components and tools must be secured or lashed.</p> <p>ii. To cordon off the working area to prevent an unauthorised entry.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by competent erector/dismantler.</p> <p>ii. Do not temporary stored any scaffolding components on any ongoing construction or erection/dismantling scaffolding.</p> <p>iii. Conduct Tool Box Talk on scaffolding erection safety prior to erection work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, suitable foot wears, safety vest and working gloves should be made mandatory.</p>
	Exposed to commit wrong dismantling sequence	Collapse of scaffolding structure and may cause fatal	No existing risk control measure	No existing risk control measure	4	5	20	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Dismantling scaffolding must be performed by competent erector/dismantler.</p> <p>ii. To provide standing supervision.</p> <p>iii. To provide safe work instruction.</p>

								<p>iv. Conduct Tool Box Talk on correct dismantling sequence prior to dismantling work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, suitable foot wears, working gloves and high visibility safety vest should be made mandatory.</p>
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CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
 TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis				3. Risk Control			
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
E. CONCRETE WORKS									
1	a. Formwork fabrication	Exposed to moving or dangerous parts machinery	Cut or entangle by moving part of machinery sustain serious injury	No existing risk control measure	4	4	16	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To fix all machine with guarding or protection device. ii. To cordon off fabricating vicinity. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. Work to be carried out by trained personnel. iii. Conduct Tool Box Talk on machinery safety prior to formwork fabrication work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, working gloves, safety vest and safety glasses should be made mandatory.

			Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To maximize usage of machinery aid to minimize manual handling. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To organise work rotation. ii. Work must be carried out by trained personnel. iii. Conduct Tool Box Talk on manual handling hazard and control prior to formwork fabrication. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory.
b. Rebar fabrication work			Expose to moving and dangerous part of machinery	Potential to be caught in between moving part of machinery and cause serious injury	No existing risk control measure	4	4	16	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To install machine guarding on moving and dangerous part of machinery. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work must be carried out by trained personnel. ii. To provide full time supervision. iii. Conduct Tool Box Talk on machinery safety prior to rebar fabrication work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/

								boots, working glove and high visibility safety vest should be made mandatory.
							YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To maximize usage of machinery aid to minimize manual handling.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To organise work rotation.</p> <p>ii. Work must be carried out by trained personnel.</p> <p>iii. Conduct Tool Box Talk on manual handling hazard and control prior to formwork fabrication.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory.</p>
							YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To maximize usage of machinery aid to minimize manual handling.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To organise work rotation.</p> <p>ii. Work must be carried out by trained personnel.</p> <p>iii. Conduct Tool Box Talk on manual handling</p>
							10	
							2	
							5	
							No existing risk control measure	
							Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	
							Excessive manual handling	
							No existing risk control measure	
							Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	
							Excessive manual handling	
							c. Formwork, Falsework and rebar installation	
							No existing risk control measure	
							Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	
							Excessive manual handling	
							a. ENGINEERING CONTROL (EC) <p>i. To maximize usage of machinery aid to minimize manual handling.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To organise work rotation.</p> <p>ii. Work must be carried out by trained personnel.</p> <p>iii. Conduct Tool Box Talk on manual handling</p>	
							10	
							2	
							5	

									hazard and control prior to formwork fabrication. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory. a. ENGINEERING CONTROL (EC) i. To provide safe access and egress. ii. To fix capping for protruding rebar. b. ADMINISTRATIVE CONTROL (AC) i. Work must be carried out by trained personnel. ii. To install capping to protruding rebar. iii. Conduct Tool Box Talk on protruding object hazards prior to re-bar installation work. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory. a. ENGINEERING CONTROL (EC) i. To cordon working vicinity. ii. To use Tag Line to control pile movement. iii. Wisel to be used by signalman as warning during hoisting. b. ADMINISTRATIVE CONTROL (AC) i. To provide standing supervision.
	Expose to sharp object	Potential to puncture and cause bodily injury	No existing risk control measure	5	2	10	YELLOW - Medium		
	Exposure to moving load	Potential to be hit or crush and cause body injury	No existing risk control measure	5	5	25	RED - High		

									<ul style="list-style-type: none"> ii. To provide train signalman. iii. Work must be carried out by trained personnel. iv. Cordon off the work area to prevent unauthorised entry. v. Conduct Tool Box Talk prior on moving load safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, high visibility safety vest and working gloves should be made mandatory.
RED - High	20	5	4	No existing risk control measure	Potential to fall from height and fatal	Expose to work at height			<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To provide safe access and egress. ii. To provide safe working platform with perimeter guard rail. iii. To install guard rail on opening edges. iv. Hard barricade/cover to floor opening. v. To provide adequate lighting. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To training on working at height safety. ii. To provide standing supervision. iii. Conduct Tool Box Talk on working at height safety prior to working at height. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/

										boots, personal fall arrest system and safety vest should be made mandatory.
d. Manual concrete casting	Expose to contact with wet cement mixture	Potential to sustain Dermatitis.	No existing risk control measure	5	2	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To use concrete pump for concrete casting work.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. To organise for work rotation.</p> <p>iii. Conduct Tool Box Talk on concreting safety prior to concrete work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet with face protection, water proof safety boots, water proof working gloves, safety vest and working jacket should be made mandatory.</p>		
	Excessive manual handling work	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To maximize usage of machinery aid to minimize manual handling.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To organise work rotation.</p> <p>ii. Work must be carried out by trained personnel.</p> <p>iii. Conduct Tool Box Talk on manual handling</p>		

									hazard and control prior to concreting. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory.
e. Mechanical aids concrete casting	Unsafe construction of falsework	Collapse of formwork/falsework	No existing risk control measure	4	5	20	RED - High		a. ENGINEERING CONTROL (EC) i. All falsework must be endorsed by Practising PE. There is no possible EC. b. ADMINISTRATIVE CONTROL (AC) i. Work to be performed by trained personnel. ii. To provide standing supervision. iii. Falsework must be inspected prior to concreting. iv. Conduct Tool Box Talk on proper falsework/formwork installation safety prior to concrete work. c. PPE CONTROL (PC) i. Wearing of safety helmet with face protection, water proof safety boots, safety vest and water proof working gloves should be made mandatory. a. ENGINEERING CONTROL (EC) i. To cordon working vicinity. ii. To use Tag Line to control pile movement if mobile crane is used for pipes unloading.
	Expose to moving concrete load	Hit and crush by load and caused fatal	No existing risk control measure	4	5	20	RED - High		

										<p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. To provide trained signalman. iii. Work must be carried out by trained personnel. iv. Conduct Tool Box Talk prior on moving load safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, high visibility safety vest and working gloves should be made mandatory.
										<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To use concrete pump for concrete casting work. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work must be carried out by trained personnel. ii. To organise for work rotation. iii. Conduct Tool Box Talk on concreting safety prior to concrete work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet with face protection, water proof safety boots, water proof working gloves, safety vest and working jacket should be made mandatory.
										<p>YELLOW - Medium</p>
										10
										2
										5
										No existing risk control measure
										Potential to sustain Dermatitis
										Expose to contact with wet cement mixture

	<p>f. Dismantling Formwork and Falsework manually</p>	<p>Unsafe construction of falsework</p>	<p>Collapse of formwork/falsework</p>	<p>No existing risk control measure</p>	<p>4</p>	<p>5</p>	<p>20</p>	<p>RED - High</p>	<p>a. ENGINEERING CONTROL (EC) i. All falsework must be endorsed by Practising Professional Engineer (PE). b. ADMINISTRATIVE CONTROL (AC) i. Work to be performed by trained personnel. ii. To provide full time supervision by Designated person. iii. Dismantling work must be carried out as per the approved and appropriate dismantling sequence. iv. Formwork/Falsework must be inspected by Designated person prior to dismantling. v. Conduct Tool Box Talk on safety dismantling of falsework/formwork. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety boots, safety vest and working gloves should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC) i. Cordon the area of dismantling formwork/falsework. b. ADMINISTRATIVE CONTROL (AC) i. To provide right dismantling sequence drawing and instruction to Designated person.</p>
	<p>Wrong dismantling sequence</p>	<p>Hit by formwork or falsework components – serious injury</p>	<p>No existing risk control measure</p>	<p>4</p>	<p>4</p>	<p>16</p>	<p>RED - High</p>	<p>a. ENGINEERING CONTROL (EC) i. Cordon the area of dismantling formwork/falsework. b. ADMINISTRATIVE CONTROL (AC) i. To provide right dismantling sequence drawing and instruction to Designated person.</p>	

										<ul style="list-style-type: none"> ii. To provide standing supervision. iii. To install safety warning signage at strategic location. iv. Conduct Tool Box Talk on dismantling sequence work safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.
g. Dismantling system type formwork using mobile crane	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium		<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To maximize usage of machinery aid to minimize manual handling. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To organise work rotation. ii. Work must be carried out by trained personnel. iii. Conduct Tool Box Talk on manual handling hazard and control prior to concreting. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory. 	
							RED - High		<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon the dismantling working area. 	

								<ul style="list-style-type: none"> ii. To use Tag Line to control load movement during dismantling work. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To deployed trained signalman. ii. Load lashing must be performed by trained rigger. iii. To provide standing supervision. iv. Conduct Tool Box Talk prior on dismantling work safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory.
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CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
 TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis					3. Risk Control		
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
F. STRUCTURAL STEEL WORK									
1	a. Delivery of steel structure components using truck of low loader	Poor access and egress	Machinery accident and overturned	No existing risk control measure	3	4	12	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To prepare safe designated access and egress road for construction machineries mobilization. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide guide to lead machineries to machinery yard. ii. To install sufficient safety road signage and route indicator. iii. Conduct Tool Box Talk on transportation safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots and, high visibility safety vest should be made mandatory.

	b. Unloading of steel structure components manually	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	4	2	8	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To maximize usage of machinery aid to minimize manual handling. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To organise work rotation. ii. Work must be carried out by trained personnel. iii. Never try to lift heavy object by yourself. iv. Conduct Tool Box Talk on manual handling hazard and control prior to concreting. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory.
c. Unloading of steel structure component using cranes	Failure of hoisting tackles during hoisting	Crush by hoisted load and fatal	No existing risk control measure	3	5	15	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon the hoisting area. ii. To use Tag Line to control load movement of the steel structure during unloading. iii. To perform load trial lifting prior to the actual lifting. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision and equipped with whistle. ii. Hoisting tackles must be inspected by trained rigger. 	

<ul style="list-style-type: none"> iii. To ensure rigging arrangement not exceeding hoisting tackles Safe WORKING Load (SWL). iv. To introduce lifting Permit To Work (PTW) system. v. Conduct Tool Box Talk prior on hoisting work safety. 	<p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/ boots, safety vest and working gloves should be made mandatory. 	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon the hoisting area. ii. To use Tag Line to control load movement of the steel structure during unloading. 	<p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision and equipped with whistle and lifting plan. ii. Hoisting tackles must be inspected by trained rigger. iii. To ensure rigging arrangement not exceeding hoisting tackles Safe WORKING Load (SWL). iv. To introduce lifting Permit To Work (PTW) system. 								
<p>RED - High</p>											

			Excessive load lifted	Overloaded and loss of load – crush and fatal	No existing risk control measure	4	5	20	RED - High	<ul style="list-style-type: none"> v. Load lashing must be performed by trained rigger. vi. Conduct Tool Box Talk prior on hoisting work safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon the hoisting area. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision and equipped with whistle and lifting plan. ii. Load preparation and lashing must be carried out by trained rigger. iii. To ensure rigging arrangement not exceeding hoisting tackles Safe WORKING Load (SWL). iv. To introduce lifting Permit To Work (PTW) system. v. Load must be total secured prior load lifting. vi. Conduct Tool Box Talk prior on hoisting and lashing safety. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/
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		Unsafe erection of working platform (scaffold)	Working platform collapse and workers fatal	No existing risk control measure	4	5	20	<p>RED - High</p>	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. Erection of working platform. ii. To install perimeter guard rails and toe board on the working platform. iii. To cordon working area. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To inspect working platform by competent scaffolder and safe tagged prior to usage. ii. To train workers for working at height. iii. To provide standing supervision for scaffolding erection. iv. Working platform design drawing should be made available for the erector. v. Erection of working platform (scaffold) must be carried out by competent erectors. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/ boots, safety vest and working gloves should be made mandatory.
	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	4	2	8	<p>YELLOW - Medium</p>	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To maximize usage of machinery aid to minimize manual handling. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To organise work 	

									<p>rotation.</p> <ul style="list-style-type: none"> ii. Work must be carried out by trained personnel. iii. Never try to lift heavy object by yourself. iv. Conduct Tool Box Talk on manual handling hazard and control prior to steel structural installation. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, suitable safety shoes/boots, working gloves and safety vest should be made mandatory. 		
										RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To install horizontal and vertical life line. ii. To install temporary guard rails as an edge protection. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. Employees must be trained to work at height. iii. Conduct Tool Box Talk on working at height hazard and control prior to erection work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, suitable shoes, working gloves, safety vest and full body harness should be made mandatory.
											20
											5
											4
											No existing risk control measure
											Potential to fall from height and may cause fatal
											Exposed to fall while working at height

CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis					3. Risk Control		
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
G. DEMOLITION WORKS									
1	a. Mechanical Demolition	Poor demolition work planning	Pre-mature collapse of structure and workers' crushed - Fatal	No existing risk control measure	5	5	25	RED - High	a. ENGINEERING CONTROL (EC) i. To conduct Engineering Survey on the structure prior to demolition work. b. ADMINISTRATIVE CONTROL (AC) i. To provide demolition design drawing and demolition plan to demolition person in charge. ii. To conduct pre-job kick off meeting prior to physical demolition work. iii. To provide standing supervision by Designated person. iv. Work must be carried out by trained personnel. v. To conduct Tool Box safety prior to demolition work. c. PPE CONTROL (PC)

									<p>i. Wearing of safety helmet, safety vest and safety shoes/boots, should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC)</p> <p>i. To conduct Engineering Survey on the structure prior to demolition work.</p> <p>ii. To demarcate structure with colour coding to distinguish demolition sequence priority.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To provide demolition design drawing and demolition plan to demolition person in charge.</p> <p>ii. To conduct pre-job kick off meeting prior to physical demolition work.</p> <p>iii. To conduct Tool Box Talk on demolition safety prior to demolition work.</p> <p>iv. To provide standing supervision by Designated Person.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p>
									RED - High
									20
									5
									4
							No existing risk control measure		
						Pre-mature collapse of structure and crush workers			
						Expose to commit wrong sequence of demolition			

									<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To maximize usage of machinery aid to minimize manual handling. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To organise work rotation. ii. Work must be carried out by trained personnel. iii. Never try to lift heavy object by yourself. iv. Conduct Tool Box Talk on manual handling hazard and control prior to steel structural installation. <p>c PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, working gloves and safety vest should be made mandatory.
									<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To install machine guarding on moving and dangerous part of machinery. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work must be carried out by trained personnel. ii. To provide standing supervision. iii. Conduct Tool Box Talk on machinery safety prior to demolition work.
Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium			
Workers expose to moving and dangerous part of machinery	Potential to be caught/entangle in moving part of machinery and cause serious injury	No existing risk control measure	4	4	16	RED - High			

<ul style="list-style-type: none"> ii. To provide mechanical ventilation if natural ventilation is inadequate. iii. To demarcate gas lines prior to demolition work. iv. To conduct frequent gas monitoring activity. 							
<p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide Supervisor with utilities lay out drawing and demolition sequence detail instruction prior to demolition work. ii. To provide standing supervision. iii. Conduct Tool Box Talk on demolition safety prior to demolition work. 							
<p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and respirator should be made mandatory. 							
<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. Ensure engine cover is fully closed. 							
<p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. To organise work rotation. iii. Work must be carried out by trained personnel. iv. To conduct Tool Box 							
RED - High							

								<p>using any mechanical machinery or powered tools.</p> <ul style="list-style-type: none"> iii. Conduct Tool Box Talk on machinery and tools safety prior to demolition work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet fixed with face protection, safety vest and safety shoes/boots should be made mandatory.
		<p>Worker exposed to fall while work at height</p>	<p>Fall from height and potential to fatal</p>	<p>No existing risk control measure</p>	<p>5</p>	<p>5</p>	<p>RED - High</p>	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To install horizontal and vertical life lines. ii. To install edges protection where appropriate. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. Workers must be trained to work at height. iii. Conduct Tool Box Talk on work at height safety prior to demolition work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, working gloves, safety vest and personal fall arrest system should be made mandatory.

CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
 TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis					3. Risk Control		
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
H. ARCHITECTURAL WORK ACTIVITIES									
H	a. Mortar Mixing Works	Expose to contact or splash by wet cement mixture	Potential to sustain dermatitis and eye injury	No existing risk control measure	3	3	9	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To conduct periodic inspection on mixing machinery and mortar.</p> <p>ii. Work must be carried out by trained personnel.</p> <p>iii. To conduct tool box talk on mortar mixing safety prior to mixing work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, water proof safety shoes/boots, water proof hand gloves, safety vest and safety face protection should be made mandatory.</p>

		Unsecured brick or compressed block	Falling object potential to hit and cause head injury and fatal	No existing risk control measure	4	5	20	RED - High	iv. To conduct tool box talk on brick or compressed block laying safety prior to laying work. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.
									a. ENGINEERING CONTROL (EC) i. To install catch platform. ii. To cordon below of laying work location to prevent unauthorised entry. iii. To erect adequate and appropriate working platform. b. ADMINISTRATIVE CONTROL (AC) i. To ensure that there are no loose brick or compressed block pallets are placed too close to building edges. ii. To keep bricks on platform only at minimum or allowable number. iii. To provide standing supervision. iv. To conduct tool box talk on hazards of falling object prior to laying work. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety vest and safety shoes/

										<p>prior to laying work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, working gloves, safety vest and personal fall arrest system should be made mandatory.</p>
e. Roofing Works	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. Never lift heavy load alone, seek assistance from other.</p> <p>iii. To organise work rotation.</p> <p>iv. Conduct Tool Box Talk on manual handling hazard and control measures prior to roofing work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p>		
										<p>a. ENGINEERING CONTROL (EC)</p> <p>i. To install horizontal life line.</p> <p>ii. To install crawler board or access plank.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To trained workers for working at height.</p>
	Expose to step on fragile roof	Potential to fall from height and may cause fatal	No existing risk control measure	5	5	25	RED - High			

f. Ceiling Works	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	4	2	8	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work must be carried out by trained personnel. ii. Never lift heavy load alone, seek assistance from other. iii. To organise work rotation. iv. Conduct Tool Box Talk on manual handling hazard and control measures prior to ceiling work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.
f. Ceiling Works	Exposed to awkward body posture	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	4	2	8	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work to be carried out by trained personnel. ii. Organise work rotation. iii. Conduct Tool Box Talk on the important of protecting body posture while working prior to ceiling work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and working glove should be made mandatory.

										<p>according to Safety Data Sheet (SDS) requirement should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. Thinner or other solvents shall be kept in a secured container and adequately labelled. ii. To provide portable fire extinguisher within the reach of the paint mixing worker. iii. Mixing work to be carried out in well ventilated area. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To identify and remove combustible material with the paint mixing location prior to work. ii. Ensure no source of fire at mixing area. ii. To provide standing supervision. iv. Conduct Tool Box Talk on flammable liquid hazard and control prior to paint mixing work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/ boots, safety vest and chemical resistant gloves should be made mandatory.
										<p>RED - High</p>
										15
										5
										3
				No existing risk control measure	Potential to cause fire, burns and property damage	Exposed to flammable liquid i.e. thinner (solvent)				

		Exposed to awkward body posture	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work must be carried out by trained personnel. ii. Organise for work rotation. iii. Conduct Tool Box Talk on body posture safety and hazard prior to painting work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoe/boots, safety vest and working gloves should be made mandatory.
		Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work must be carried out by trained personnel. ii. Never lift heavy load alone, seek assistance from other. iii. Conduct Tool Box Talk on manual handling hazard and control prior to manual handling work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.

										<p>supervision.</p> <p>ii. Employees must be trained to work at height.</p> <p>iii. Conduct Tool Box Talk on working at height hazard and control prior to painting work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, working gloves, safety vest and body harness should be made mandatory.</p>
										<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. Never lift heavy load alone, seek assistance from other.</p> <p>iii. Conduct Tool Box Talk on manual handling hazard and control prior to manual handling work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC)</p> <p>i. To deployed flag man to control traffic movement.</p> <p>ii. To demarcate work</p>
										<p>YELLOW - Medium</p>
										<p>10</p>
										<p>2</p>
										<p>5</p>
										<p>No existing risk control measure</p>
										<p>Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)</p>
										<p>Excessive manual handling</p>
										<p>h. Flexible pavement Laying</p>
										<p>Exposed to high speed vehicle</p>
										<p>Potential to hit by vehicle and caused fatal.</p>
										<p>No existing risk control measure</p>
										<p>5</p>
										<p>5</p>
										<p>25</p>
										<p>RED - High</p>

CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
TABLE OF COMMON CONSTRUCTION WORK ACTIVITIES

1. Hazard Identification		2. Risk Analysis					3. Risk Control		
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures
I. MECHANICAL & ELECTRICAL ACTIVITIES									
I	a. Electrical Wiring	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. Never lift heavy load alone, seek assistance from other.</p> <p>iii. Conduct Tool Box Talk on manual handling hazard and control prior to wiring work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/ boots, safety vest and working gloves should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC)</p> <p>i. Step ladder must be of sound construction and within required Safe Working Load (SWL).</p>
		Misuse of "A" type ladder as working platform	Potential to fall down and caused bodily injury	No existing risk control measure	4	3	12	YELLOW - Medium	

									<ul style="list-style-type: none"> ii. Step ladder footing must be fixed with anti-slip slipper. iii. Step ladder both legs must be fully extended. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To always keep 2/3 of the body rest on the step ladder. ii. To implement buddy system. iii. Work must be carried out by trained personnel. iv. To conduct Tool Box Talk on ladder safety prior to wiring work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety vest and safety shoes/boots should be made mandatory.
									<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To install temporary top rail and mid rail as an edge protection. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. Employees must be trained to work at height. iii. Conduct Tool Box Talk on working at height hazard and control prior to wiring work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots working gloves,
									<p>RED - High</p>
									25
									5
									5
									No existing risk control measure
									Potential to fall from height and may cause fatal
									Exposed to fall while working at height

									<p>safety vest and body harness should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. There is no possible EC. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Work to be carried out by trained personnel. ii. Conduct Tool Box Talk on puncturing hazard and control prior to wiring work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.
									<p>YELLOW - Medium</p>
									<p>YELLOW - Medium</p>
									<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To used only insulated electrical powered tools. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To carry out inspection of electrical powered tools by user prior to usage. ii. Do not operate electrical hand tools with wet hand. iii. To conduct Tool Box Talk on electrical safety prior to cable ladder installation work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/
									<p>8</p>
									<p>2</p>
									<p>4</p>
									<p>4</p>
									<p>No existing risk control measure</p>
									<p>Potential to puncture hand and caused hand injury</p>
									<p>Exposed to sharp tools or wiring materials</p>
									<p>Potential to sustain electrocuted</p>
									<p>Exposed to use defective electrical powered tools</p>
									<p>12</p>
									<p>4</p>
									<p>3</p>
									<p>No existing risk control measure</p>
									<p>Potential to sustain electrocuted</p>
									<p>Exposed to use defective electrical powered tools</p>

										boots, working gloves, safety vest and safety glasses should be made mandatory.
b. Cable Ladder Installation	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	YELLOW - Medium		<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. Never lift heavy load alone, seek assistance from other.</p> <p>iii. Conduct Tool Box Talk on manual handling hazard and control prior to cable ladder installation work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p>	
				4	5	20	RED - High		<p>a. ENGINEERING CONTROL (EC)</p> <p>i. Working platform must be erected by competent erector.</p> <p>ii. Only approved materials must be used for the platform erection.</p> <p>iii. Top most working platform is fixed with top rail and mid rail.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To inspect working platform prior to use.</p>	

		Exposed to fall while working at height	Potential to fall from height and may cause fatal	No existing risk control measure	5	5	25	RED - High	<p>ii. Working platform must be inspected by competent scaffolder every 7 days once.</p> <p>iii. Conduct Tool Box Talk on safe working on working platform prior to cable ladder installation work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, safety vest and body harness should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC)</p> <p>i. To install horizontal and vertical life line.</p> <p>ii. To install temporary top and mid rails as an edge protection.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. To provide standing supervision.</p> <p>ii. Employees must be trained to work at height.</p> <p>iii. Conduct Tool Box Talk on working at height hazard and control prior to erection work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, suitable shoes, working gloves, high visibility safety vest, body harness should be made mandatory.</p>
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		Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	<p>shirt should be made mandatory.</p> <p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. Never lift heavy load alone, seek assistance from other.</p> <p>iii. Conduct Tool Box Talk on manual handling hazard and control prior to cable laying work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p>
	d. Plumbing	Excessive manual handling	Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)	No existing risk control measure	5	2	10	<p>a. ENGINEERING CONTROL (EC)</p> <p>i. There is no possible EC.</p> <p>b. ADMINISTRATIVE CONTROL (AC)</p> <p>i. Work must be carried out by trained personnel.</p> <p>ii. Never lift heavy load alone, seek assistance from other.</p> <p>iii. Conduct Tool Box Talk on manual handling hazard and control prior to plumbing work.</p> <p>c. PPE CONTROL (PC)</p> <p>i. Wearing of safety helmet, safety shoes/</p>

								<p data-bbox="161 174 384 477">i. Work must be carried out by trained personnel. ii. Conduct Tool Box Talk on puncturing hazard and control prior to ducting installation work.</p> <p data-bbox="392 174 560 477">c. PPE CONTROL (PC) i. Wearing of safety helmet, safety vest, safety shoes/boots and working gloves should be made mandatory.</p> <p data-bbox="568 174 687 477">a. ENGINEERING CONTROL (EC) i. There is no possible EC.</p> <p data-bbox="695 174 919 477">b. ADMINISTRATIVE CONTROL (AC) i. Work must be carried out by trained personnel. ii. Never lift heavy load alone, seek assistance from other. iii. Conduct Tool Box Talk on manual handling hazard and control prior to ducting installation work.</p> <p data-bbox="927 174 1238 477">c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, safety vest and working gloves should be made mandatory.</p> <p data-bbox="1246 174 1453 477">a. ENGINEERING CONTROL (EC) i. Working platform must be erected by competent erector. ii. Only approved materials must be</p>	<p data-bbox="576 544 632 678">YELLOW - Medium</p>	<p data-bbox="576 757 600 790">10</p>	<p data-bbox="576 902 600 925">2</p>	<p data-bbox="576 1037 600 1059">5</p>	<p data-bbox="576 1171 655 1305">No existing risk control measure</p>	<p data-bbox="576 1328 775 1507">Potential to sustain body injury and Musculoskeletal Disorder Syndrome (MSDs)</p>	<p data-bbox="576 1597 655 1709">Excessive manual handling</p>	<p data-bbox="1254 1529 1302 1709">Unsafe working platform</p>	<p data-bbox="1254 1977 1398 2022">RED - High</p>	<p data-bbox="1254 2089 1278 2112">25</p> <p data-bbox="1254 2157 1278 2179">5</p> <p data-bbox="1254 2224 1278 2240">5</p> <p data-bbox="1254 1171 1334 1305">No existing risk control measure</p> <p data-bbox="1254 1373 1398 1507">Working platform collapse potential to cause fatal</p>
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									used for the platform erection. iii. Top most working platform is fixed with top and mid rails. iv. Working platform must be inspected by competent scaffolder every 7 days once. b. ADMINISTRATIVE CONTROL (AC) i. To inspect working platform prior to use. ii. Work must be carried out by trained personnel. ii. Conduct Tool Box Talk on safe working on working platform prior to air-con ducting installation work. c. PPE CONTROL (PC) i. Wearing of safety helmet, safety shoes/boots, safety vest and body harness should be made mandatory.
									a. ENGINEERING CONTROL (EC) i. To practice Lock out and Tag out system (LOTO). b. ADMINISTRATIVE CONTROL (AC). i. Initial power supply activation only can be performed by Authorized Chargeman during Testing and commissioning (T&C) work. ii. T&C only can be performed by
									YELLOW - Medium
								10	
								5	
								2	
							No existing risk control measure		
							Potential to cause fire and explosion		
							Explosion hazard Distribution Board (DB)/ Transformer)		
							f. Testing and Commissioning		

<p>authorized and trained personnel.</p> <ul style="list-style-type: none"> iii. Supervisor in-charged to ensure there are no flammable materials exist within the T&C vicinity. iv. Fire Fighting Team shall be on standby mode during T&C work. v. To provide adequate fire extinguisher with in T&C vicinity. vi. Conduct Tool Box Talk on fire and explosion hazard and control prior to hot work. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/ boots, safety vest and working gloves should be made mandatory. <p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To demarcate electric cable routing clearly. ii. Only used adequate insulated hand tools. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. Only trained electrician can performed T&C works. ii. To display visibly "Danger High Voltage" signage at strategic vicinity. iii. Never touch any electrical circuit or components wit wet hands. iv. Conduct Tool Box Talk 											

								<ul style="list-style-type: none"> iii. Work must be carried out by trained personnel. iv. To conduct Tool Box Talk on noise hazard prevention. <p>c. PPE CONTROL (PC)</p> <ul style="list-style-type: none"> i. Wearing of safety helmet, safety shoes/ boots, safety vest and ear plugs or ear muff should be made mandatory.
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CIS ON CONSTRUCTION ACTIVITIES RISK ASSESSMENT (CARA - HIRARC)
 RISK STATUS/RATING AFTER APPLICATION OF RECOMMENDED CONTROL MEASURES (RCM) - (Page 1 of 2)

1. Hazard Identification		2. Risk Analysis				3. Risk Control		4. Risk Status After Application of RCM					
Item	Work Activity	Hazard	Consequences/ Effect may cause	Existing Risk Control *Presuming there is no control measure	Likelihood	Severity	Risk Rating	Risk Classification	Recommended Control Measures	Likelihood	Severity	Risk Rating	Risk Classification
J. CONCRETE WORKS													
	e. Mechanical aids concrete casting	Expose to moving concrete load	Hit and crush by load and caused fatal	No existing risk control measure	4	5	20	RED - High	<p>a. ENGINEERING CONTROL (EC)</p> <ul style="list-style-type: none"> i. To cordon working vicinity. ii. To use Tag Line to control pile movement if mobile crane is used for pipes unloading. <p>b. ADMINISTRATIVE CONTROL (AC)</p> <ul style="list-style-type: none"> i. To provide standing supervision. ii. To provide trained signalman. iii. Work must be carried out by trained personnel. iv. Conduct Tool Box Talk prior on moving load safety. 	2	4	8	YELLOW - Medium

Acknowledgement

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