

APPENDIX-H

LIST OF PROCEDURES (MINIMUM) TO BE FORMING PART OF HSE PLAN:-

A. HSE Management Procedures:

- HSE Risk Management (including JSA/HIRA)
- HSE Legal Compliance and Other Requirements
- HSE Objectives & Performance
- HSE Training and Competence (including Induction)
- HSE Motivation & Award Scheme
- HSE Audits
- HSE Meetings
- HSE Sub Contractor Management
- HSE Emergency Management
- HSE Incidents Reporting and Management
- HSE Reports
- HSE Management System Review
- HSE Change Management
- HSE procedure for Behaviour based Safety
- First Aid & Management
- Roles, Responsibility, accountabilities and Authorities

B. Job procedures/Safe Operating procedures

- Setting Up Site & Signage's
- Handling of Electrical Appliances
- Working at Height
- Confined Space Entry
- Permit to Work (including hot works)
- Housekeeping
- Lifting Operations
- Transportation of materials including Manual Handling
- Compressed Air Tools and Units
- Earthmoving Operations & excavation
- Scaffolding
- Fire Prevention/Protection
- Hazardous Substance handling & Storage
- Radiation Hazard
- Personal Protective Equipment

FORMAT NO. : HSE-1 REV 0

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SAFETY WALK-THROUGH REPORT

(Name & signature of walk through performer to be inserted at the bottom of each page)

Project : _____ Report no. : _____

Date : _____ Contractor : _____

Inspection by : _____ Owner : _____

Frequency : Monthly Job no. : _____

Note : Write 'NA' wherever the item is not applicable

SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory/ No	Remarks	Action
1.	HOUSEKEEPING				
a)	Waste containers provided and used				
b)	Sanitary facilities adequate and Clean				
c)	Passageways and Walkways Clear				
d)	General neatness of working areas				
e)	Other				
2.	PERSONNEL PROTECTIVE EQUIPMENT				
a)	Goggles; Shields				
b)	Face protection				
	Hearing protection				
	Foot protection				
e)	Hand protection				
f)	Respiratory Masks etc.				
g)	Full body harness conforming to CE, EN 361				
h)	Hard hat (HDPE)				
i)	Other				
3.	EXCAVATIONS/OPENINGS				
a)	Openings properly covered or barricaded				
b)	Excavations shored				
c)	Excavations barricaded				
d)	Overnight lighting provided				
e)	Other				

Safety walk-through performer (Name & Signature).....

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SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory/ No	Remarks	Action
4.	WELDING & GAS CUTTING				
a)	Gas cylinders chained upright				
b)	Cables and hoses not obstructing				
c)	Screens or shields used				
d)	Flammable materials protected				
e)	Live electrode bits contained properly				
f)	Fire extinguisher (s) accessible				
g)	Other				
5.	SCAFFOLDING & BARRICADING				
a)	Fully decked platforms				
b)	Guard and intermediate rails in place				
c)	Toe boards in place				
d)	Adequate shoring				
e)	Adequate access				
f)	Positive barricading for critical activities				
g)	Installation of warning signs				
h)	Other				
6.	LADDERS				
a)	Extension side rails 1 m above				
b)	Top of landing				
c)	Properly secured				
d)	Angle + 70° from horizontal				
e)	Other				

Safety walk-through performer (Name & Signature).....

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SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory /No	Remarks	Action
7.	HOISTS, CRANES AND DERRICKS				
a)	Condition of cables and sheaves OK				
b)	Condition of slings, chains, hooks and eyes O.K.				
c)	Inspection and maintenance log-books maintained				
d)	Outriggers used				
e)	Reverse horn installed / active / coupled with gear				
f)	Signs/barricades provided				
g)	Signals observed and understood				
h)	Qualified operators				
i)	Other				
8.	MACHINERY, TOOLS AND EQUIPMENT				
a)	Proper instruction				
b)	Safety devices				
c)	Proper cords				
d)	Inspection and maintenance				
e)	Other				
9.	VEHICLE AND TRAFFIC				
a)	Rules and regulations observed				
b)	Inspection and maintenance				
c)	Licensed drivers				
d)	Other				

Safety walk-through performer (Name & Signature).....

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SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory /No	Remarks	Action
10.	TEMPORARY FACILITIES				
a)	Emergency instructions posted				
b)	Fire extinguishers provided				
c)	Fire-aid equipment available				
d)	Secured against storm damage				
e)	General neatness				
f)	In accordance with electrical requirements				
g)	Other				
11.	FIRE PREVENTION				
a)	Personnel trained & instructed to make use of facility				
b)	Fire extinguishers checked periodically & record maintained				
c)	No smoking in Prohibited areas.				
d)	Fire Hydrants not obstructed Clear				
e)	Other Regular fire drill conducted				
12.	ELECTRICAL				
a)	Use of 3-core armored cables everywhere				
b)	Usage of 'All insulated' or 'double-insulated' electrical tools				
c)	All electrical connection are routed through ELCB				
d)	Natural Earthing at the source of power (Main DB)				
e)	Continuity and tightness of earth conductor				
f)	Effective covering of junction boxes, panels and other energized wiring places				
g)	Ground fault circuit interrupters provided				
h)	Prevention of tripping hazards maintained				
f)	DCP extinguishers arranged & licensed electrician engaged at site				

Safety walk-through performer (Name & Signature).....

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SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory /No	Remarks	Action
14.	HANDLING AND STORAGE OF MATERIALS				
a)	Safely stored or stacked				
b)	Passageways clear / free from obstructions				
c)	Fire fighting facility in place				
15.	FLAMMABLE GASES AND LIQUIDS				
a)	Containers clearly identified / protected from fire				
b)	Safe storage & transportation arrangement made				
c)	Fire extinguishers positioned nearby				
d)	Facilities kept away from electric spark, hot spatters & ignition source.				
16.	WORKING AT HEIGHT				
a)	Approved Erection plan and work permit in place				
b)	Safe access, Safe work platform & Safety nets provided				
c)	Life lines, Fall arrester, Full body harness and with double lanyards used;				
d)	Health Check record available for workers going up?				
e)	Protective handrails arranged around floor openings				
17.	CONFINED SPACE				
a)	Work Permit obtained from requisite authority				
b)	Test for toxic gas and sufficient availability of oxygen conducted & status				
c)	Supervisor present at site & at least one person outside the confined space for monitoring deputed				
d)	Availability of safe means of entry, exit and ventilation (register for entry & exit maintained)				
e)	Fire extinguisher and first-aid facility ensured				
f)	Lighting provision made by using 24V Lamp				
g)	Proper usage of PPEs ensured				
18.	RADIOGRAPHY				
a)	Proper storage and handling of source as per BARC/ AERB guidelines (authorized radiographer available)				
b)	Work permit obtained				

Safety walk-through performer (Name & Signature).....

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SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory /No	Remarks	Action
c)	Cordoning of the area done				
d)	Use of appropriate PPE's ensured				
e)	HSE training to workers/supervisors imparted during the fortnight (indicate topic)				
f)	Minimum occupancy of workplace ensured				
19.	HEALTH CHECKS				
a)	All Workers medically examined and found be fit for working at heights (slinging, rigging, painting etc.) in confined space in excavation / trenching in shot blasting				
b)	Availability of First Aid box with contents				
c)	Proper sanitation at site, office and labour camps				
d)	Arrangement of medical facilities.				
e)	Measures for dealing with illness at site & labour camps.				
f)	Availability of Potable drinking water for workmen & staff.				
g)	Provision of crèches for children.				
h)	Stand by vehicle / ambulance available for evacuation of injured				
20.	ENVIRONMENT				
a)	Chemical and Other Effluents properly disposed				
b)	Cleaning liquid of pipes disposed off properly				
c)	Seawater used for hydro-testing disposed off as per agreed procedure				
d)	Lubricant Waste/Engine oils properly disposed				
e)	Waste from Canteen, offices, sanitation etc disposed properly				
f)	Disposal of surplus earth, stripping materials, Oily rags and combustible materials done properly				
g)	Green belt protection				

Safety walk-through performer (Name & Signature).....

FORMAT NO. : HSE-2 REV 0

(Sheet 1 of 3)

ACCIDENT / INCIDENT REPORT

(To be submitted by Contractor after every Incident / Accident within 24 hours to EIL/ Owner)

Report No.: _____ Date: _____

Project site: _____ Name of work: _____

Contractor's name: _____ Contractor's Job Engineer (name) _____

Non-disabling injury (Non-LTA)	Hospitalized but resumed duty before end of 48 hrs	
Disabling injury (other LTA)	Hospitalized & failed to resume duty within next 48 hrs	
Fatal (LTA):	Death / Expiry	
First Aid case (non LTA)	Resume duty after first aid	

Name of the injured: _____ Father's name of victim: _____

Sub Contractor's Name: _____

Gate Pass No.: _____ Age: _____ Yrs. Victim's medical fitness exam. (Pre-empl.) date: - _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1) _____ (2) _____ (3) _____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post-grad		Other/specify	

Job Experience

NIL		Less than 2 yrs		2-5 yrs	
5-10 yrs		11-15 yrs		15 years and above	

Location where the incident happened: _____

FORMAT NO. : HSE-2 REV 0

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Activity / Works that was continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident?

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Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Trunk (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals or oils		Vehicle accident	
Other/specify					

FORMAT NO. : HSE-2 REV 0

(Sheet 3 of 3)

Medical Aid provided: – (indicate specific aids / treatment etc.)-

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Actions taken to prevent recurrence of similar incident / accident:

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Intimation to local authorities (Dist Collector / Local Police Station / ESI authority): Yes / No / NA.

If yes, to whom

Safety Officer
(Signature and Name)

Site Head / Resident Construction Manager
(Signature and Name)
Stamp of Contractor

To : Owner

: RCM/Site-in-charge EIL (3 copies)

 ├─ Divisional Head (Constn) through RCM

 └─ Project Manager, EIL, through RCM

FORMAT NO. : HSE-3 REV 0

(Sheet 1 of 5)

SUPPLEMENTARY INCIDENT / ACCIDENT INVESTIGATION REPORT

TICK THE APPROPRIATE ONE AS APPLICABLE (furnish within 72 hours)

Supplementary to Incident / Accident Report No: _____ (Copy enclosed)

Report No.: _____ Date: _____

Project site: _____ Name of work: _____

Contractor's name: _____ Contractor's Job Engineer (name) _____

Non-disabling injury (Non-LTA)	Hospitalized but resumed duty before end of 48 hrs	
Disabling injury (other LTA)	Hospitalized & failed to resume duty within next 48 hrs	
Fatal (LTA):	Death / Expiry	
First Aid case (non LTA)	Resume duty after first aid	

Name of the injured: _____ Father's name of victim: _____

Sub Contractor's Name:

Gate Pass No.: Age: _____ Yrs. Victim's medical fitness exam. (Pre-empl.) date: - _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1) _____ (2) _____ (3) _____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c.operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs		2-5 yrs	
5-10 yrs		11-15 yrs		15 years and above	

Location where the incident happened: _____

FORMAT NO. : HSE-3 REV 0

(Sheet 2 of 5)

Activity / Works that was continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident?

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Particular of tools & tackles being used and condition of the same after incident/accident:

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Description of Incident/Accident (How the incident was caused):

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Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Trunk (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

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(Sheet 3 of 5)

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals or oils		Vehicle accident	
Other/specify					

Name & Designation of person who provided First-Aid to the victim: -----

Name & Telephone number of Hospital where the victim was treated _____

Mode of transport used for transporting victim – Ambulance / Private car / Tempo / Truck / Others

How much time taken to shift the injured person to Hospital _____

In case of FATAL incident, indicate clearly the BOCW Registration No. of the victim /Company.....

Comments of Medical Practitioner, who treated / attended the victim/injured (attached / described here) _____

What actions are taken for investigation of the incident, please indicate clearly – (Video film / Photography / Measurements taken etc.....)

Immediate cause (Please tick the right applicable) –

Hazardous methods or procedures inadequately guarded		Poor housekeeping		Inadequate or improper PPE	
Environmental hazards (excess noise/space constraint/inadequate ventilation)		improper illumination/Moving on oval surface		Working on dangerous equipment	

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Failure to secure		Horse-play		Failure to use PPE	
Inattention to surroundings		Improper use of hands & body-parts		By-passing safety devices	
Unsafe mixing or placement of tools & tackles		Bypassing standard procedures		Failure in communication	
Operating without authority		Improper use of equipment or tools & tackles		drug or alcoholic influence	
excessive haste		Others(specify)			

Basic cause

Over confidence		Impulsiveness		over-exertion	
Faulty judgement or poor understanding		Failing to keep attention constantly		Nervousness & Fear	
Fatigue		Defective vision		Ill health or sickness	
Slow reaction		Others(specify)			

Root cause

Inadequate Engg		Improper Design		Inadequate Planning & organization	
Inadequate knowledge		Inadequate skill		Inadequate training	
Inadequate supervision		Improper work procedure		Inadequate compliance with standard	
Substandard performance		Inadequate maintenance		Improper inspection	
Others(specify)					

Loss of man days and impact on site works, (if any) –

Remarks from Contractor's Safety Officer / Engineer –

Was the victim performing relevant tasks for which he was engaged /employed? Yes / No
 Was the Supervisor present on work-site during the incident? Yes / No
 Have the causes of incident rightly identified? Yes / No
 Cause of Accident was _____

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(Sheet 5 of 5)

Remedial measures recommended by Safety Officer of Contractor for avoiding similar incident in future

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Intimation to local authorities (Dist Collector / Local Police Station / ESI authority): Yes / No / NA.

If yes, to whom

Safety Officer
(Signature and Name)

Site Head / Resident Construction Manager
(Signature and Name)
Stamp of Contractor

To : Owner
: RCM// Site-in-charge of EIL (3 copies)
→ Divisional Head (Constn) through RCM
→ Project Manager EIL, through RCM

FORMAT NO. : HSE-4 REV 0

NEAR MISS INCIDENT/ DANGEROUS OCCURRENCE SUGGESTED PROFORMA
(to be submitted within 24 hours)

- **Near Miss :** Human injury escaped & no damage to property, equipment or interruption to work.
- **Dangerous Occurrence:** Damage to property, equipment or interruption of work, but not resulting in personal injury/illness, e.g. Fire incident, collapse of structure, crane failure, etc

Report No.: _____

Name of Site: _____

Date: _____

Name of work: _____

Contractor: _____

Incident reported by :

Date & Time of Incident :

Location :

Brief description of incident

Probable cause of incident

Suggested corrective action

Steps taken to avoid recurrence

Yes ☐

No ☐

To : Owner
: RCM/Site-in-charge EIL (3 copies)

→ Divisional Head (Constn) through RCM
→ Project Manager EIL, through RCM

FORMAT NO. : HSE-5 REV 0

MONTHLY HEALTH, SAFETY & ENVIRONMENT (HSE) REPORT

(To be submitted by each Contractor)

Actual work start Date: _____ For the Month of: _____

Project: _____ Report No: _____

Name of the Contractor: _____ Status as on : _____

Name of Work : _____ Job No : _____

(Contractor in consultation with EIL shall generate the reports through web based package(www.eil.co.in/conthse) only.

ITEM	UPTO PREVIOUS MONTH	THIS MONTH	CUMULATIVE
1) Average number of Staff & Workmen (average daily headcount, not man days)			
2) Man-hours worked			
3) Number of Induction programmes conducted			
4) Number of HSE meetings organized at site			
5) Number of HSE awareness programmes conducted at site			
6) Number of Tool Box Talks conducted			
7) Number of Lost Time Accidents (LTA)	Fatal		
	Other LTA		
8) Number of Loss Time Injuries (LTI)	Fatalities		
	Other LTI		
9) Number of Non-Loss Time Accidents			
10) Number of First Aid Cases			
11) Number of Near Miss Incidents			
12) No. of unsafe acts/ practices detected			
13) No. of disciplinary actions taken against staff/ workmen			
14) Man-days lost due to accidents			
15) LTA Free man-hours i.e. LTA free man-hours counted from the Last LTA (enter date:)			
16) Frequency Rate (No. of LTA per 2 lacs man-hours worked)			
17) Severity Rate (No. of man days lost per 2 lacs man-hours worked)			
18) Loss Time Injury Frequency (No. of LTI per 2 lacs man-hours worked)			
19) No. of activities for which Job Safety Analysis (JSA) completed			
20) No. of incentives/ awards given			
21) No. of occasions on which penalty imposed by EIL/ Owner			
22) No. of Audits conducted			
23) No. of pending NCs in above Audits			
24) Compensation cases raised with Insurance			
25) Compensation cases resolved and paid to workmen			
26) Whether workmen compensation policy taken		Yes	No
27) Whether workmen compensation policy is valid		Yes	No
28) Whether workmen registered under ESI Act, as applicable		Yes	No
Remarks, if any			

Date:

Prepared by Safety Officer
(Signature and Name)

To : - OWNER

- RCM EIL (2 copies)

Approved by Site Head / Resident Construction Manager
(Signature and Name)

FORMAT NO. : HSE-6 REV 0

PERMIT FOR WORKING AT HEIGHTS (ABOVE 2.0 METER)

(In duplicate to be issued daily for site and for office)

Permit No..... Name of Main Contractor.....
Name of work executing agency / sub agency / vendor:.....
Date..... Exact Location of work.....
Nature of work Duration of work (from) (to)
Number of workers covered within this permit.....
(List enclosed with name & gate pass numbers.)

Sl. No.	Items / Subjects	Status of compliance (Yes / No)	
1	Work areas / Equipments inspected		
2	Work area cordoned off		
3	Adequate lighting is provided		
4	Precautions against public traffic taken		
5	Concerned persons in & around have been alerted & cautioned		
6	Hazards / risks involved in routine / non-routine task assessed and control measures have been implemented at specific task		
7	ELCB provided for electrical connection & found working		
8	Ladder safely attached / fixed		
9	Scaffoldings are checked and TAGs are found used correctly		
10	Working platforms are provided and are found sound /safe for use		
11	Safe access & egress arrangements (e.g. ladders, fall arresters, life-lines etc.) are satisfactorily incorporated		
12	a. Openings on platform / floors are effectively cordoned / covered		
	b. Safety Nets are provided wherever required		
13	Use of following safety gadgets by people working at area under this permit, is checked and found satisfactory - Safety helmet Safety harness (full body) with double lanyard Safety Shoes Safety gloves Safety goggles		
14	Housekeeping of work area found satisfactorily tidy / clean & clear		
15	Adequate measures have been taken for works being continued at the ground level, when simultaneous works are permitted overhead at that very location.		
16	Materials are not thrown from heights on to ground		
17	Medical examination of workers are made & found satisfactory		
18	Responsible job engineer / supervisor found physically present at work spot for overall administration of work as well as safety of people.		

Above items have been checked & compliance has been found in place. Hence work is permitted to start / continue at the above-mentioned location. Work shall not start till identified lapses are rectified.

Additional Precautions, if any

Work Permit issued by
Contractor Engineer/RCM

Verification By
Contractor Safety Officer

AT THE END OF THE DAY/WORK:

All works at height are completed & workmen have returned safely from work location at (time)..... (date).....

(Sig. Contractor Engineer)

FORMAT NO. : HSE-7 REV 0

CONFINED SPACE ENTRY PERMIT

Project site _____ Sr.No. _____
Name of the work _____ Date _____
Name of Contractor _____ Nature of work _____
Exact location of work _____

Safety Requirements POSITIVE ISOLATION OF THE VESSEL IS MANDATORY							
(A) Has the equipment been ?							
Y	NR		Y	NR		Y	NR
<input type="checkbox"/>	<input type="checkbox"/>	Isolated from	<input type="checkbox"/>	<input type="checkbox"/>	water flushed &/or	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	power/steam/air	<input type="checkbox"/>	<input type="checkbox"/>	steamed	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	isolated from liquid or	<input type="checkbox"/>	<input type="checkbox"/>	Man ways open &	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	gases	<input type="checkbox"/>	<input type="checkbox"/>	ventilated	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	depressurized &/or	<input type="checkbox"/>	<input type="checkbox"/>	cont. inert gas flow	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	drained	<input type="checkbox"/>	<input type="checkbox"/>	adequately cooled	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	blanked/blinded/	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	disconnected					
(B) Expected Residual Hazards							
<input type="checkbox"/>	<input type="checkbox"/>	lack of O ₂	<input type="checkbox"/>	<input type="checkbox"/>	combustible gas/ liquid	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	corrosive chemicals	<input type="checkbox"/>	<input type="checkbox"/>	pyrophoric iron / scales	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	heat/ steam / frost	<input type="checkbox"/>	<input type="checkbox"/>	high humidity	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
(C) Protection Measures							
<input type="checkbox"/>	<input type="checkbox"/>	gloves	<input type="checkbox"/>	<input type="checkbox"/>	ear plug / muff	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	protective clothing	<input type="checkbox"/>	<input type="checkbox"/>	dust / gas / air line mask	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	grounded air duct/blower	<input type="checkbox"/>	<input type="checkbox"/>	attendant with SCBA/air	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	/AC	<input type="checkbox"/>	<input type="checkbox"/>	mask	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Fire fighting arrangements	<input type="checkbox"/>	<input type="checkbox"/>	safety harness & lifeline	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Authorization / Renewal (It is safe to enter the confined space)							
	No. of persons allowed	Name of persons allowed	Signature		Time		Signature
			Contractor's Supervisor	Contractor's Safety Officer	From	To	Workman
Permit Closure :							
(A) Entry <input type="checkbox"/> was closed <input type="checkbox"/> stopped <input type="checkbox"/> will continue on ...							
(B) <input type="checkbox"/> Site left in a safe condition <input type="checkbox"/> Housekeeping done							
(C) Multilock <input type="checkbox"/> removed <input type="checkbox"/> key transferred							
<input type="checkbox"/> Ensured all men have come out <input type="checkbox"/> Man-ways barricaded							
Remarks, if any:							

FORMAT NO. : HSE-8 REV 0

RADIATION WORK PERMIT

Project : Sr.No. :
Name of the work : Date :
Name of site contractor : Job No. :

Location of work :

Source strength :

Cordoned distance (m) :

Name of Radiography agency :

Approved by Owner/EIL

☐

No. of workers engaged :
(List enclosed with name & gate pass numbers.)

1

The following items have been checked & compliance shall be ensured during currency of the permit:

S. No.	Item description	Done
	Safety regulations as per BARC/AERB ensured while source in use/in transit & during storage	<input type="checkbox"/>
	Area cordoned off / safe working platform provided	<input type="checkbox"/>
	Lighting arrangements for working during nights ensured	<input type="checkbox"/>
	Warning signs/ flash lights installed	<input type="checkbox"/>
	Cold work permit taken (if applicable)	<input type="checkbox"/>
	PPEs like film badges, dosimeters used	<input type="checkbox"/>

Additional precautions, if any _____

(Radiography Agency's BARC/AERB authorized Supervisor)

Permission is granted.

Permit is valid from _____ AM/PM _____ Date to _____ AM/PM _____
Date

(Signature of permit issuing authority of site contractor)

Name : Designation: Date:

Permit renewal:

Permit extended up to		Additional precautions required, if any	Sign of issuing authority with date (of site contractor)
Date	Time		

Work completed/ stopped/ area cleared at _____ Hrs of Date _____

(Sign. of permit issuing authority)

Name & Signature of site contractor:

FORMAT NO. : HSE-9 REV 0
DEMOLISHING/DISMANTLING WORK PERMIT

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :

Name of sub-contractor : No. of workers to be engaged:
(List enclosed with name & gate pass numbers.)

Line No./ Equipment No./ Structure to be dismantled :

Location details of dismantling/ demolition with sketch : (clearly indicate the area)

The following items have been checked & compliance shall be ensured during currency of the permit:

S. No.	Item description	Done	Not Applicable
	Services like power, gas supply, water, etc. disconnected	<input type="checkbox"/>	<input type="checkbox"/>
	Dismantling/ Demolishing method reviewed & approved	<input type="checkbox"/>	<input type="checkbox"/>
	Usage of appropriate PPEs ensured	<input type="checkbox"/>	<input type="checkbox"/>
	Precautions taken for neighbouring structures	<input type="checkbox"/>	<input type="checkbox"/>
	First-Aid arrangements made	<input type="checkbox"/>	<input type="checkbox"/>
	Fire fighting arrangements ensured	<input type="checkbox"/>	<input type="checkbox"/>
	Precautions taken for blasting	<input type="checkbox"/>	<input type="checkbox"/>

(Contractor's Supervisor)

(Contractor's Safety Officer)

Permission is granted.

(Permit issuing authority)

Name :

Date :

Completion report :

Dismantling/ Demolishing is completed on _____ Date at _____ Hrs.

Materials/ debris transported to identified location ☐ Tagging completed (as applicable) ☐

Services like power, gas supply, water, etc. restored ☐

(Permit issuing authority)

CONTRACTOR's NAME

FORMAT NO. : HSE-10 REV 0

DAILY SAFETY CHECKLIST

(To make use of before start of day's work)

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :

Description of Job decided to perform : -

• Use of PPE / Safety Gadgets

Sl. No	PPEs	Compliance (Yes / No)	Sl. No	PPEs	Compliance (Yes / No)
1	Safety Helmets		6	Face Shield	
2	Safety Shoes		7	Full body harness	
3	Hand Gloves		8	Fall Arrest System	
4	Dust Musk		9	Safety net	
5	Safety Goggles		10	Horizontal life-line made of steel wire, (dia not less than 8.0 mm.)	

(Serial No. 1 & 2 are compulsory for everyone. Specify & ensure use of other safety gadgets as required for the job)

• Identify following important unsafe conditions: -

Sl. No	Conditions	Yes / No
1	Access to work site / emergency escape clear	
2	Soil / Loose earth kept away from excavated pit / slope / ladder provided	
3	Electrical wire / welding lead lying entangled on ground / welding m/c. booth accessible	
4	Elevated work platform / open ends are protected	
5	Ground area cordoned off before lifting works or erection at height / ground area checked & cordoned-off before start of height works	
6	Structural members / erected pipes / wooden boards/pieces etc. are safely anchored at heights and are not likely to fall down on people when working beneath	
7	Rope ladders tied-up on tall steel structures, long before are removed to get rid of their use	
8	Any Other	

• Indicate actions taken, if status of any of the above items is found "No"

.....

• Specific Safety guidelines / precautions, if any (communicated thro' TBT)

.....

• Above conditions and PPE compliances are checked by undersigned and correct status are indicated after verification

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-11 REV 0

(Sheet 1 of 2)

HOUSEKEEPING ASSESSMENT & COMPLIANCE

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :
Name of contractor : Fortnightly

SI No.	Subjects of Review	Satisfactory/ Yes	Non satisfactory/No	Remarks	Action
1.	Cleanliness at the Main entry / access of site				
2.	Ground condition / floor areas free from water-logging / oil spillage				
3.	Ground & elevated floors free from rubbish / wastes / accumulated debris / scraps.				
4.	Manholes / openings are covered / fenced				
5.	Trenches are barricaded / walkways are in place				
6.	Drains are cleaned / not choked / not occupied by dumped materials				
7.	Sufficient CAUTION boards / instructions displayed				
8.	Construction machinery are maintained & parked in orderly manner.				
9.	Movement of site people are not obstructed because of dumping / storing of construction materials				
10.	Access / egress to Electrical Distribution Boards / Panels clear from wires / cables / earth-strips etc.				
11.	Electrical panel rooms / sheds / MCC / Control rooms / Substations etc. are clean & tidy and not used for storing dress / clothes, tiffin-box or bicycles.				
12.	Passage behind Elec. panels are free for access				
13.	Fire extinguishers / fire-buckets are accessible without any difficulty.				
14.	Stair-steps, platforms & landings are clear & tidy				
15.	Sheds / rooms & work areas have got sufficient illumination as well as ventilation				
16.	Cables / Wires / welding leads are routed / hanged appropriately & are not creating unsafe condition.				
17.	Stacking / storing of insulation materials or their packing.				
18.	Removal or cleanliness of left-over sand, concrete, brick-bats, insulation-materials, excess earth, wastes etc.				
19.	Storing / stacking of sand, metal chips, re-bars, steel pipes, valves, fittings etc.				
20.	One escape route at ground & minimum two escape routes at elevation available,				

FORMAT NO. : HSE-11 REV 0

(Sheet 2 of 2)

Sl No.	Subjects of Review	Satisfactory/ Yes	Non satisfactory/No	Remarks	Action
21.	Captions / Posters / Slogans on various safety instructions are displayed legibly in local language				
22.	Cable trenches are water-free or regular arrangement for taking out accumulated water exists.				
23.	Windows of rooms / offices are regularly cleaned				
24.	Facilities for cycle sheds, drinking water, washing, rest-rooms etc. are maintained in tidy manner.				
25.	Toilet, Urinals, Canteen / kitchen / pantry etc. are maintained & free from obnoxious smell.				
26.	Construction tools / tackles are stored systematically - the items are tagged / tested / certified by competent third party.				
27.	Sufficient numbers of Dust-bins / Waste-bins found at site and are regularly emptied.				

Additional remarks, if any -

.....
.....
.....

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-12 REV 0

INSPECTION OF TEMPORARY ELECTRICAL BOOTH / INSTALLATION

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :
Sub Station No./Booth No Location:

SL NO	SUBJECTS	OBSERVATION (YES /NO)	ACTION TAKEN
1	Switchboards installed properly are in order and protected from rain & water-logging.		
2	Adequate illumination provided for switchboard operation during night hours & the lamps are protected from direct human contact.		
3	Voltage ratings, DANGER signs, Shock-Treatment-Chart displayed in the installation / booth		
4	Fire extinguisher (DCP or CO ₂) & Sand Bucket kept in close vicinity of Switchboards		
5	Valid License & Competent Electrician / Wireman available & name/ license no. displayed at booth / installation.		
6	General housekeeping in & around booth / installation found in order.		
7	Cable-route-markers for U/G cables provided.		
8	Monthly inspection report of Electrical hand tools available in booth / installation.		
9	Insulated Mat provided in front of Elec. Panels.		
10	Rubber hand gloves available/ used by Electricians		
11	Availability of CAUTION boards for shutdown & / or repairing works.		
12	All incoming & outgoing feeders have proper MCCB / HRC fuses / Switches.		
13	Switchboards "earthed" at two distinctly isolated locations.		
14	Switchboards have adequate operating space at the front face & at the rear face too.		
15	All connections provided through 30mA ELCB.		
16	Testing records of all ELCBs available at site		
17	Only industrial type plugs & sockets are used.		
18	Temporary connections are 3-core double insulated & free from cuts & joints and 3 rd core is earthed at both ends		
19	Socket boards are properly mounted on stand & protected from water ingress.		
20	Electrical equipments operating above 250V have two earthing / double earthing.		
21	All incoming / outgoing cables are properly glanded & terminated with "lugs".		
22	Switch-boards are of industrial variety / type.		
23	Sketch for installation / connection (SLD) made & pasted & other safety labels/display boards		
24	Labeling of incoming / outgoing feeders made.		
25	All hand lamps are protected from direct contact.		
26	All electrical cable / joints are in safe condition		

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-13 REV 0

(Sheet 1 of 2)

INSPECTION FOR SCAFFOLDING

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :

Sl. No	Description	Yes	No	N.A	Actions taken
1	Whether work permit is obtained to take up work at height above 1.5 Mts?				
2	Whether atmospheric condition is "stormy" or "raining" and works at heights have been permitted?				
3	Whether steel pipes scaffoldings are used for units /off-site areas?				
4	Whether scaffolding has been erected on rigid/firm/leveled surfaces / ground? Whether "foot-seals" or "base-plates" are used beneath the up-rights (vertical steel pipes)				
5	Whether scaffold construction is as per IS specification with toe-board and hand-rails (top-rail as well as mid-rail)?				
6	Whether distance between two successive up-rights are less than 2.5 Mts (height of scaffold & load carrying capacity governs the distance between two uprights)				
7	Whether all uprights are extended at least 900 mm above the top most working platform (to enable fitting of handrails)?				
8	Whether vertical distance of two successive ledgers is satisfactory? (varying between 1.3 Mts. To 2.1 Mts)				
9	Whether the peripheral areas of working at height are cordoned-off? (for avoiding accident to people arising out of dropped / deflected materials)				
10	Whether platform is provided? Is it safely approachable?				
11	Whether end of scaffold platform / board are extended beyond transoms? (125mm to 150 mm)				
12	Whether CE / IS approved quality and worthy conditioned full-body safety harness (with double lanyard & karabiners) are used while working at heights?				
13	Whether life-line of safety harness is anchored to an independent secured support capable of withstanding load of a falling person?				
14	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person / vehicle?				
15	Whether clamps used are of good condition, of adequate strength and free from defects?				
16	Whether ladder is placed at secured and leveled surface?				
17	Whether water-pass and oil-spills are avoided around the scaffold structure?				
18	Whether ladder is extended 1.5mts. above the landing point at height?				
19	Whether more than one access/egress provided to the scaffold?				
20	Whether ladder used are of adequate length and overlapping of short ladders avoided?				
21	Whether metallic ladders are placed much away from near-by electrical transmission line?				
22	Whether rungs of ladder are inspected and found in good order?				
23	Whether fall-arresters provided on both the access/egress routes?				
24	Whether diagonal (cross) bracings are provided at regular interval on the scaffold?				
25	Whether working platform on the scaffold has been made free from "jolt" or "gap"?				
26	Whether tools or materials are removed after completion of the day's job at heights?				
27	Whether a valid Permit for Work (PFW) is obtained before taking up work over asbestos or fragile roof?				
28	Whether sufficient precaution is taken while working on fragile roof?				

FORMAT NO. : HSE-13 REV 0

(Sheet 2 of 2)

Sl. No	Description	Yes	No	N. A	Actions taken
29	Whether provision is made to arrange duck ladder, crawling board for working on fragile roof?				
30	Whether scaffold has been inspected by qualified civil engineers prior to their use?				
31	Whether the scaffolding has been designed for the load to be borne by the same?				
32	Whether the erection and dismantling of the scaffolding is being done by trained persons and under adequate supervision?				
33	Whether safety net with proper working arrangement and life-line has been provided?				
34	Whether TAGS (Green for acceptable and Red for incomplete/unsafe scaffolds) are used on scaffolds?				
35	Whether sufficient illumination is provided in and around the scaffold and access?				
36	Whether emergency rescue / response arrangements are made in place				

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-14 REV 0

(sheet 1 of 2)

PERMIT FOR ERECTION / MODIFICATION & DISMANTLING OF SCAFFOLDING

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :
Nature of activities : Duration: From.....To.....

SL. No.	SUBJECTS / ITEMS	DONE	NOT DONE	REMARKS
1	Specific task of Erection / Modification / Dismantling of scaffolds, identified & TAGGED accordingly (before as well as after carrying-out jobs).			
2	People engaged in doing the job are identified & are certified by Job Engineer of Main Contractor as experienced / trained.			Names to be noted
3	Concerned persons are alerted by the Job Engineer of Main Contractor in connection with possible hazards & what the workmen MUST do / MUST not do.			
4	Verification by Job Engineer of Main Contractor made for confirming that all persons permitted to carry-out the jobs are making use of Helmet, Safety Shoes, Goggles, Gloves & Double lanyard safety harness and other relevant PPEs.			
5	Area of work is effectively cordoned-off / barricaded / illuminated.			
6	For taking-up / lowering down Scaffolding members / clamps / couplings etc. appropriate ropes / pulleys/ chains etc. have been arranged for use (not to throw any item) & the same have been verified as "fit for purpose".			
7	Items / members of scaffold, being lowered are removed from the area & stacked correctly.			
8	Ropes, chains, pulley blocks etc. being used for lifting or lowering scaffold items, are inspected by the Job Engineer & their certifications as well as physical conditions have been found O.K, before signing this PERMIT.			
9	Safety Net / Life-line / Fall Arresters etc. are arranged in position and Job Engineer has found working conditions favourable for activities to start.			
10	Scaffold erection or dismantling tasks are being supervised by Experienced Engineer / Competent person.			
11	Only competent & experienced people have been selected / engaged in Scaffolding erection, modification or dismantling tasks.			
12	Adequate & effective actions for traffic and movement of people around the cordoned-off area taken to avoid inadvertent incident			
13	Working platforms are protected with handrails & toe-boards.			
14	Access & Exit (for reach & escape) are safe for use by people.			
15	Tools, tackles to be used for above jobs are verified by job Engineers of Main contractor as genuinely good and tied-up at height (to prevent their fall).			
16	Site important Telephone Nos. are made known to everyone			
17	SOP (Safe Operating Procedure) for the specific task is made & followed too.			
18	Emergency vehicle has been arranged at work locations.			

- This permit for work shall be available at specific work location all the time.
- After completion of work, permit shall be returned to safety cell of main contractor, without fail.
- This Permit shall be issued maximum upto (Monday to Sunday).
- Additional Precautions, if any

-
• ACCORD OF PERMISSION (to be ticked) - YES () / NO ()

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer]

FORMAT NO. : HSE-14 REV 0

(sheet 2 of 2)

Everyday Site working conditions & performance of workmen shall be assessed / checked by Contractor Site Engr. and Safety Officer shall verify the same .

	Name / Sign.	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Site Engr.								
Safety Off.								

FORMAT NO. : HSE-15 REV 0

PERMIT FOR HEAVY LIFT/CRITICAL ERECTION

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :
Nature of activities : Duration: From.....To.....
Location of work : Name /Type of crane :
Equipment/Structure to be erected: Wt. of equipment/ structure to be erected :

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1)	Is the crane type suitable for lift or as per erection procedure?				
2)	Is the crane have the correct number of counterweights fitted?				
3)	Availability of Load Certification of crane from authorized agency.				
4)	Is the load chart of crane available in crane cabin/or with Crane operator?				
5)	Is the device to check the Wind speed in crane is working? Is the safety features in crane are working?				
6)	Availability of Load certification of slings and other accessories from authorized agency				
7)	Availability of Licensee/certificate for crane operator from authorized agency.				
8)	Availability of approved JSA for the subject activities.				
9)	Availability of approved erection/rigging procedures.				
10)	Availability of temporary gratings/ platforms for critical lifting(as applicable)				
11)	Tool Box conducted before erection?				
12)	Has the area been cordoned off?				
13)	Are the authorized persons during erection are identified?				
14)	Does each person identified for erection understand their roles and responsibilities?				
15)	Is the ground on which crane will rest or outrigger support are correct?				
16)	Is hard stand requirement (if any) complied?				
17)	Is the communication system (viz walkie talkies,etc are working properly?				
18)	If more than one crane is lifting the load, is an Intermediate rigger will supervise the lift?				
19)	If there is other obstruction within the operating radius of the crane, have correct precautions been taken to prevent collision?				
20)	All the persons are wearing the requisite PPE?				

Inspected & Issued by
Contractor Engineer/RCM

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-16 REV 0

PERMIT FOR ENERGY ISOLATION & DE-ISOLATION

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :

ENERGY ISOLATION PERMIT	
<ul style="list-style-type: none"> Clearance required from:.....HrsDate ToHrsDate Name of equipment/ energy source etc Nature of job to be done: Area.....Location:..... 	
PERMIT VALIDATION I hereby authorize thepersonnel(performer) to isolate the above equipment/energy source from all sources of power and handover the equipment/energy source for maintenance/repair. Issuing authority Area –Incharge/RCM Signature: _____ Date: _____ Name: _____	PERFORMING AUTHORITY The work and precautions will be carried out under my overall responsibility.(Testing/execution engineer) Signature: _____ Date: _____ Name: _____
SAFETY PRECAUTIONS FOR CLEARANCE <ol style="list-style-type: none"> 1. Notify workers of intent to de- energize <input type="checkbox"/> 2. Obtain lock,tag or locking/tagging devices <input type="checkbox"/> 3. Shut down ,de energize, dissipate any residual energies. <input type="checkbox"/> 4. Apply lock ,tag and locking and/or tagging devices <input type="checkbox"/> 5. *Any other job specific precautions <input type="checkbox"/> 6. Verify effectiveness of lockout by attempting to restart. <input type="checkbox"/> 7. Proper PPE is ensured <input type="checkbox"/> I certify that the energy source mentioned above is isolated from all sources and is safe to start the work. Tag No:..... Lock No:..... Issuing authority Area –Incharge/RCM Signature: _____ Date: _____ Name: _____ (*to be included by contractor in consultation with EIL/owner)	NORMALISING AFTER CLEARANCE <ol style="list-style-type: none"> 1. Notify workers of intent to re- energize <input type="checkbox"/> 2. Conduct visual inspection to confirm that the danger zone is clear of workers <input type="checkbox"/> 3. Conduct visual inspection to confirm that tools ,equipments danger zone is clear of workers <input type="checkbox"/> 4. Reposition the safety devices(interlocks, valves, guards, covers ,sensors, as applicable, etc) <input type="checkbox"/> 5. *Any other job specific normalizing details <input type="checkbox"/> 6. Remove lock, tag and locking and/or tagging devices. <input type="checkbox"/> 7. Re energize. <input type="checkbox"/> 8. Confirm system is operating properly& safely I certify that the energy source mentioned above is isolated from all sources and is safe to start the work. Tag No:..... Lock No:..... Issuing authority Area –Incharge/RCM Signature: _____ Date: _____ Name: _____ (*to be included by contractor in consultation with EIL/owner)
ENERGY DE-ISOLATION PERMIT	
PERMIT VALIDATION I hereby authorize thepersonnel(performer) to de- isolate the above equipment/energy source from all sources of power and handover the equipment/energy source for normal operation.. Issuing authority Area –Incharge/RCM Signature: _____ Date: _____ Name: _____	PERFORMING AUTHORITY I herby certify that the equipment/energy source mentioned above has been de-isolated and is ready for normal operation.(Testing/execution engineer) Signature: _____ Date: _____ Name: _____ Countersigned by Issuing authority

FORMAT NO. : HSE-17 REV 0

PERMIT FOR EXCAVATION

(depth 2m and above)

(Sheet 1 of 2)

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :
Job Description : Location :
Size of excavation :

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1)	Suitable and sufficient risk assessments and method statements has been carried to ensure that the work shall be undertaken in accordance with specification and standard.				
2)	Are plans/details of underground services available and the same has been reviewed?				
3)	Has survey done to locate the services/obstacles, etc.				
4)	Has the live services (electrical, water line, air line, telephone line, etc) has been disabled for carrying out the job.				
5)	Is adequate barriers/fences to protect the excavation are in place?				
6)	Is Adequate warning signs are in place?				
7)	Is Assessment of ground conditions done and remedial action (if any) taken?				
8)	Safe access / egress (e.g. ramp / steps / ladders etc.) provided for site workmen & supervisors.				
9)	Is the excavation work being undertaken in proximity of structure, etc ? If Yes, it's effect is considered?				
10)	Availability of competent person for supervising the excavation work?				
11)	Adequate safe arrangement to prevent collapse of edges (e.g. shoring / strutting / benching / sloping etc.) made at site.				
12)	Hard barricades (at least 1.0M away from edge & for excavation near site access roads) with warning signs/caution boards are provided				
13)	Accumulation / passage-ways of water at periphery of excavation / trench stopped/ restricted.				
14)	Is the equipment being used for excavation has been checked for adequacy and is in good working condition having all the safety features?				
15)	Age & fitness of workmen ensured by medical test before engagement in job ?				
16)	Arrangement of Monitoring of possible oxygen deficiency or obnoxious gases done & action taken?				

PERMIT GRANTED - Yes / No

(List enclosed with name & gate pass numbers.)

Name & Signature of Site Engr
Contractor (Initiator)

Name & Signature of Safety Officer
Contractor (Issuing authority)

FORMAT NO. : HSE-17 REV 0

PERMIT FOR EXCAVATION

(Sheet 2 of 2)

NOTES: -

1. Slopes or benches for excavation beyond 2.0M depth shall be designed & approved by Contractor's site head.
2. Excavated earth to be kept at least 1.5M away from edges
3. Safety helmets, Safety shoes or gum-boots, gloves, goggles, Face shield, Safety Harness shall be essential PPEs.
4. Permit shall be made in **duplicate** and original shall be available at site of work.
5. Permit shall be issued for maximum **one week** only (Monday to Sunday)
6. After completion of works, permit shall be closed & preserved for record purpose

GRANT OF PERMIT AND EXTENSIONS

Sl. No.	Validity period From ____ To ____	Working Time From ____ To ____	Initiator (site Engr. of Main Contractor)	Issuing authority (Safety Officer of Main Contractor)	Review by EIL / Owner (Remarks with date)
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Additional safety instructions if any: -

- 1.
- 2.
- 3.

SAFETY PRACTICES DURING CONSTRUCTION

OISD-GDN-192

**Oil Industry Safety Directorate
Government of India
Ministry of Petroleum and Natural Gas**

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SAFETY PRACTICES DURING CONSTRUCTION

1.0 INTRODUCTION

Safety in Construction Management deserves utmost attention especially in the hydrocarbon industry, such as Exploration, Refineries, Pipelines and Marketing installations, Gas Processing units etc. Construction is widely recognised as one of the accident prone activities. Most of the accidents are caused by inadequate planning, failure during the construction process and/or because of design deficiencies. Besides property loss, accidents also result in injuries and fatalities to the personnel; same needs to be prevented.

The reasons for accidents during construction activities are related to unique nature of the industry, human behaviour, difficult work-site conditions, extended odd duty hours, lack of training & awareness and inadequate safety management. Unsafe working methods, equipment failure and improper housekeeping also tend to increase the accident rate in construction.

Ensuring good quality of materials, equipment and competent supervision along with compliance of standard engineering practices shall go a long way to in built safety into the system.

The objective of this standard is to provide practical guidance on technical and educational framework for safety and health in construction with a view to:

- (a) prevent accidents and harmful effects on the health of workers arising from employment in construction;
- (b) ensure appropriate safety during implementation of construction;
- (c) provide safety practice guidelines for appropriate measures of planning, control and enforcement.

2.0 SCOPE

This document specifies broad guidelines on safe practices to be adhered to during construction activities in oil industry. However, before commencing any job, specific hazards and its effects should be assessed and necessary corrective/preventive actions should be taken by all concerned. The document is intended only to supplement and not to

replace or supersede the prevailing statutory requirements, which shall also be followed as applicable. For Personal Protective Equipment, OISD-STD-155 (Part I&II) shall be referred to. The scope of this document does not include the design aspects and quality checks during construction.

3.0 DEFINITIONS

Definitions of various terminology are given below:

- *Adequate, appropriate or suitable* are used to describe qualitatively or quantitatively the means or method used to protect the worker.
- *Brace*: A structural member that holds one point in a fixed position with respect to another point; bracing is a system of structural members designed to prevent distortion of a structure.
- *By hand*: The work is done without the help of a mechanised tool.
- *Competent Authority*: A statutory agency having the power to issue regulations, orders or other instructions having the force of law.
- *Competent person*: A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill for the safe performance of the specific work. The competent authorities may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.
- *Execution agency*:
Any physical or legal person, having contractual obligation with the owner, and who employs one or more workers on a construction site
- *Owner*:
Any physical or legal person for whom construction job is carried out.
It shall also include owner's designated representative/consultant/nominee/agent , authorised from time to time to act for and on its behalf, for supervising/

coordinating the activities of the execution agency.

- *Hazard*: Danger or potential danger.
- *Guard-rail*: An adequately secured rail erected along an exposed edge to prevent persons from falling.
- *Hoist*: A machine, which lifts materials or persons by means of a platform, which runs on guides.
- *Lifting gear*: Any gear or tackle by means of which a load can be attached to a lifting appliance but which does not form an integral part of the appliance or load.
- *Lifting appliance*: Any stationary or mobile appliance used for raising or lowering persons or loads.
- *Means of access or egress*: Passageways, corridors, stairs, platforms, ladders and any other means for entering or leaving the workplace or for escaping in case of danger.
- *Scaffold*: Any fixed, suspended or mobile temporary structure supporting workers and material or to gain access to any such structure and which is not a lifting appliance as defined above.
- *Toe-board*: A barrier placed along the edge of a scaffold platform, runway, etc., and secured there to guard against the slipping of persons or the falling of material.
- *Worker*: Any person engaged in construction activity.
- *Workplace*: All places where workers need to be or to go by reason of their work.

4.0 GENERAL DUTIES

4.1 GENERAL DUTIES OF EXECUTION AGENCIES

4.1.1 Execution agency should:

- i) provide means and organisation to comply with the safety and health measures required at the workplace.
- ii) provide and maintain workplaces, plant, equipment, tools and machinery and organise

construction work so that, there is no risk of accident or injury to health of workers. In particular, construction work should be planned, prepared and undertaken so that:

- (a) dangers, liable to arise at the workplace, are prevented;
 - (b) excessively or unnecessarily strenuous work positions and movements are avoided;
 - (c) organisation of work takes into account the safety and health of workers;
 - (d) materials and products used are suitable from a safety and health point of view;
 - (e) working methods are adopted to safeguard workers against the harmful effects of chemical, physical and biological agents.
- iii) establish committees with representatives of workers and management or make other arrangement for the participation of workers in ensuring safe working conditions.
 - iv) arrange for periodic safety inspections by competent persons of all buildings, plant, equipment, tools, machinery, workplaces and review of systems of work, regulations, standards or codes of practice. The competent person should examine and ascertain the safety of construction machinery and equipment.
 - v) provide such supervision to ensure that workers perform their work with due regard to safety and health of theirs as well as that of others.
 - vi) Employ only those workers who are qualified, trained and suited by their age, physique, state of health and skill.
 - vii) satisfy themselves that all workers are informed and instructed in the hazards connected with their work and environment and trained in the precautions necessary to avoid accidents and injury to health.
 - viii) Ensure that buildings, plant, equipment, tools, machinery or workplaces in which a dangerous defect has been found should not be used until the defect has been rectified.

- ix) Organise for and remain always prepared to take immediate steps to stop the operation and evacuate workers as appropriate, where there is an imminent danger to the safety of workers.
- x) establish a checking system by which it can be ascertained that all the members of a shift, including operators of mobile equipment, have returned to the camp or base at the close of work on dispersed sites and where small groups of workers operate in isolation.
- xi) provide appropriate first aid, training and welfare facilities to workers as per various statutes like the Factories Act, 1948 etc. and, whenever collective measures are not feasible or are insufficient, provide and maintain personal protective equipment and clothing in line with the requirement as per OISD-STD-155 (Vol. I & II) on Personnel Protective Equipment. They should also provide access to workers to occupational health services.
- xii) Educate workers about their right and the duty at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on working procedures adopted as may affect safety and health.
- xiii) Ensure that except in an emergency, workers, unless duly authorised, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury to health.
- xiv) Ensure that workers do not operate or interfere with plant and equipment that they have not been duly authorised to operate, maintain or use.
- xv) Ensure that workers do not sleep, rest or cook etc in dangerous places such as scaffolds, railway tracks, garages, confined spaces or in the vicinity of fires, dangerous or toxic substances, running machines or vehicles and heavy equipment etc.
- xvii) Obtain the necessary clearance/permits as required and specified by owner
- xviii) As per the Govt. circular as amended from time to time all contractors who employ more than 50 workers or where the contract value exceeds Rs. 50 crores, the following facilities are to be provided by contractor at site :
- Arrangement for drinking water
 - Toilet facilities
 - A creche where 10 or more women workers are having children below the age of 6 years
 - Transport arrangement for attending to emergencies
- xix) should deploy a safety officer at site
- 4.2 GENERAL DUTIES OF OWNERS**
- 4.2.1 Owners should:
- i) co-ordinate or nominate a competent person to co-ordinate all activities relating to safety and health on their construction projects;
 - ii) inform all contractors on the project of special risks to health and safety;
 - iii) Ensure that executing agency is aware of the owner's requirements and the executing agency's responsibilities with respect to safety practices before starting the job.
- 5.0 SAFETY PRACTICES AT WORK PLACES**
- 5.1. GENERAL PROVISIONS**
- 5.1.1 All openings and other areas likely to pose danger to workers should be clearly indicated.
- 5.1.2 Workers & Supervisors should use the safety helmet and other requisite Personal Protective Equipment according to job & site requirement. They should be trained to use personal protective equipment.
- 5.1.3 Never use solvents, alkalis and other oils to clean the skin.
- 5.1.4 Lift the load with back straight and knees bent as far as possible. Seek the help in case of heavy load.

5.1.5 Ensure the usage of correct and tested tools and tackles. Don't allow the make shift tools and tackles.

5.1.6 No loose clothing should be allowed while working near rotating equipment or working at heights.

5.2 MEANS OF ACCESS AND EGRESS

Adequate and safe means of access (atleast two, differently located) to and egress from all workplaces should be provided. Same should be displayed and maintained.

5.3 HOUSEKEEPING

5.3.1 Ensure:

- i) proper storage of materials and equipment;
- ii) removal of scrap, inflammable material, waste and debris at appropriate intervals.

5.3.2 Removal of loose materials, which are not required for use, to be ensured. Accumulation of these at the site can obstruct means of access to and egress from workplaces and passageways.

5.3.3 Workplaces and passageways, that are slippery owing to oil, grease or other causes, should be cleaned up or strewn with sand, sawdust, ash etc.

5.4 PRECAUTIONS AGAINST THE FALL OF MATERIALS & PERSONS AND COLLAPSE OF STRUCTURES

5.4.1 Precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person against injury by the fall of materials, or tools or equipment being raised or lowered.

5.4.2 Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.

5.4.3 All openings through which workers are liable to fall should be kept

effectively covered or fenced and displayed prominently.

5.4.4 As far as practicable, guardrails and toe-boards should be provided to protect workers from falling from elevated workplaces.

5.5 PREVENTION OF UNAUTHORISED ENTRY

5.5.1 Construction sites located in built-up areas and alongside vehicular and pedestrian traffic routes should be fenced to prevent the entry of unauthorised persons.

5.5.2 Visitors should not be allowed access to construction sites unless accompanied by or authorised by a competent person and provided with the appropriate protective equipment.

5.6 FIRE PREVENTION AND FIRE FIGHTING

5.6.1 All necessary measures should be taken by the executing agency and owner to:

- i) avoid the risk of fire;
- ii) control quickly and efficiently any outbreak of fire;
- iii) bring out a quick and safe evacuation of persons.
- iv) Inform unit/fire station control room, where construction work is carried out within existing operating area.

5.6.2 Combustible materials such as packing materials, sawdust, greasy/oily waste and scrap wood or plastics should not be allowed to accumulate in workplaces but should be kept in closed metal containers in a safe place.

5.6.3 Places where workers are employed should, if necessary to prevent the danger of fire, be provided with:

- i) suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible;
- ii) an adequate water supply at sufficient pressure meeting the requirements of various OISD standards.

5.6.4 To guard against danger at places having combustible material,

- workers should be trained in the action to be taken in the event of fire, including the use of means of escape.
- 5.6.5 At sites having combustible material, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.
- 5.6.6 Means of escape should be kept clear at all times. Escape routes should be frequently inspected particularly in high structures and where access is restricted.
- 5.7 LIGHTING**
- 5.7.1 Where natural lighting is not adequate, working light fittings or portable hand-lamps should be provided at workplace on the construction site where a worker will do a job.
- 5.7.2 Emergency lighting should be provided for personnel safety during night time to facilitate standby lighting source, if normal system fails.
- 5.7.2 Artificial lighting should not produce glare or disturbing shadows.
- 5.7.3 Lamps should be protected by guards against accidental breakage.
- 5.7.4 The cables of portable electrical lighting equipment should be of adequate size & characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations.
- 5.8 PLANT, MACHINERY, EQUIPMENT AND HAND TOOLS**
- 5.8.1 General Provisions**
- i) Plant, machinery and equipment including hand tools, both manual and power driven, should:
- be of proper design and construction, taking into account health, Safety and ergonomic principles.
 - be maintained in good working order;
 - be used only for work for which they have been designed.
- d) be operated only by workers who have been authorised and given appropriate training.
- e) be provided with protective guards, shields or other devices as required.
- ii) Adequate instructions for safe use should be provided.
- iii) Safe operating procedures should be established and used for all plant, machinery and equipment.
- iv) Operators of plant, machinery and equipment should not be distracted while work is in progress.
- v) Plant, machinery and equipment should be switched off when not in use and isolated before any adjustment, clearing or maintenance is done.
- vi) Where trailing cables or hose pipes are used they should be kept as short as practicable and not allowed to create a hazard.
- vii) All moving parts of machinery and equipment should be enclosed or adequately guarded.
- viii) Every power-driven machine and equipment should be provided with adequate means, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it from being started again inadvertently.
- ix) Operators of plant, machinery, equipment and tools should be provided with PPEs, including where necessary, suitable ear protection.
- 5.8.2 Hand tools**
- i) Hand tools should be repaired by competent persons.
- ii) Heads of hammers and other shock tools should be dressed or ground to a suitable radius on the edge as soon as they begin to mushroom or crack.
- iii) When not in use and while being carried or transported sharp tools should be kept in sheaths, shields, chests or other suitable containers.
- iv) Only insulated or nonconducting tools should be used on or near live electrical installations.

- v) Only non-sparking tools should be used near or in the presence of flammable or explosive dusts or vapours.

5.8.3 Pneumatic Tools

- i) Operating triggers on portable pneumatic tools should be:
 - a) so placed as to minimise the risk of accidental starting of the machine.
 - b) so arranged as to close the air inlet valve automatically when the pressure of the operator's hand is removed.
- ii) Hose and hose connections for compressed air supply to portable pneumatic tools should be:
 - a) designed and tested for the pressure and service for which they are intended;
 - b) fastened securely on the pipe outlet and equipped with the safety chain, as appropriate.
- iii) Pneumatic shock tools should be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel.
- iv) Pneumatic tools should be disconnected from power and the pressure in hose lines released before any adjustment or repair is made.

5.8.4 Electrical Tools

- i) Low voltage portable electrical tools should generally be used.
- ii) All electrical tools should be earthed, unless they are "all insulated" or "double insulated" tools which do not require earthing.
- iii) All electrical tools should get inspected and maintained on a regular basis by a competent electrician and complete records kept.

5.8.5 Engines

- i) Engines should:
 - a) be installed so that they can be started safely and the maximum safe speed cannot be exceeded.
 - b) have controls for limiting speed.

- c) have devices to stop them from a safe place in an emergency.
- ii) IC engines should not be run in confined spaces unless adequate exhaust ventilation is provided.
- iii) When IC engines are being fuelled:
 - a) the engine should be shut off.
 - b) care should be taken to avoid spilling fuel;
 - c) no person should smoke or have an naked light in the vicinity.
 - d) a fire extinguisher should be kept readily available.
- iv) Secondary fuel reservoir should be placed outside the engine room.

6.0 CONSTRUCTION ACTIVITIES

The various common activities in construction are as under:

- Excavation
- Scaffolding, Platforms & Ladders
- Structural Work, Laying of Reinforcement & Concreting
- Road Work (Laying of roads)
- Cutting /Welding
- Working in Confined Space
- Proof/Pressure Testing
- Working at Heights
- Handling & Lifting Equipments
- Vehicle Movement
- Electrical
- Offshore
- Demolition
- Radiography
 - Sand/shot blasting/ spray painting
 - Work above water

The safe practices to be followed during the implementation of above construction activities are given below:

6.1 EXCAVATION

- 6.1.1 All excavation work should be planned and the method of excavation and the type of support

work required should be decided considering the following:

- i) the stability of the ground;
 - ii) the excavation will not affect adjoining buildings, structures or roadways;
 - iii) to prevent hazard, the gas, water, electrical and other public utilities should be shut off or disconnected, if necessary;
 - iv) presence of underground pipes, cable conductors, etc.,
 - v) the position of culvert/bridges, temporary roads and spoil heaps should be determined;
- 6.1.2 Before digging begins on site, all excavation work should be planned and the method of excavation and the type of support work required decided.
- 6.1.3 All excavation work should be supervised.
- 6.1.4 Sites of excavations should be thoroughly inspected:
- i) daily, prior to each shift and after interruption in work of more than one day;
 - ii) after every blasting operation;
 - iii) after an unexpected fall of ground;
 - iv) after substantial damage to supports;
 - v) after a heavy rain, frost or snow;
 - vi) when boulder formations are encountered.
- 6.1.5 Safe angle of repose while excavating trenches exceeding 1.5m depth upto 3.0m should be maintained. Based on site conditions, provide proper slope, usually 45° , and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock or provide proper shoring and strutting to prevent cave-in or slides.
- 6.1.6 As far as possible, excavated earth should not be placed within one meter of the edge of the trench or depth of trench whichever is greater.
- 6.1.7 Don't allow vehicles to operate too close to excavated area. Maintain atleast 2m distance from edge of excavation. No load, plant or equipment should be placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endanger any person unless precautions such as the provision of shoring or piling are taken to prevent the sides from collapsing.
- 6.1.8 Adequately anchored stop blocks and barriers should be provided to prevent vehicles being driven into the excavation. Heavy vehicles should not be allowed near the excavation unless the support work has been specially designed to permit it.
- 6.1.9 If an excavation is likely to affect the security of a structure on which persons are working, precautions should be taken to protect the structure from collapse.
- 6.1.10 Barricade at 1m height (with red & white band/self glowing caution board) should be provided for excavations beyond 1.5m depth. Provide two entries/exits for such excavation.
- 6.1.11 Necessary precautions should be taken for underground utility lines like cables, sewers etc. and necessary approvals/clearances from the concerned authorities shall be obtained before commencement of the excavation job.
- 6.1.12 Water shall be pumped/bailed out, if any accumulates in the trench. Necessary precautions should be taken to prevent entry of surface water in trenches.
- 6.1.13 During rains, the soil becomes loose. Take additional precaution against collapse of side wall.
- 6.1.14 In hazardous areas, air should be tested to ascertain its quality. No one should be allowed entry till it is suitable for breathing.
- 6.1.15 In case of mechanised excavation, precaution shall be taken to not to allow anybody to come within one meter of extreme reach of the mechanical shovel. The mechanised excavator shall be operated by a well-trained experienced operator. When not in operation, the machine shall be kept on firm leveled ground with mechanical shovel resting on ground. Wheel or belt shall be suitably jammed to prevent any accidental movement of the

machine. Suitable precautions as per manufacturer guidelines should be taken for dozers, graders and other heavy machines.

- 6.1.16 In case of blasting, follow strictly IS:4081-1986 & Indian Explosive Act and rules for storage, handling and carrying of explosive materials and execution of blasting operation.

6.2 SCAFFOLDING, PLATFORMS & LADDERS

6.2.1 Metal as material of construction

- i) A scaffold should be provided and maintained or other equally safe and suitable provision should be made where work cannot safely be done on or from the ground or from part of a building or other permanent structure.
- ii) Scaffolds should be provided with safe means of access, such as stairs, ladders or ramps. Ladders should be secured against inadvertent movement.
- iii) Every scaffold should be constructed, erected and maintained so as to prevent collapse or accidental displacement when in use.
- iv) Every scaffold and part thereof should be constructed :
 - (a) in such a way so as not to cause hazards for workers during erection and dismantling;
 - (b) in such a way so as guard rails and other protective devices, platforms, ladders, stairs or ramps can be easily put together;
 - (c) with sound material and of requisite size and strength for the purpose for which it is to be used and maintained in a proper condition.
- v) Boards and planks used for scaffolds should be protected against splitting.
- vi) Materials used in the construction of scaffolds should be stored under good conditions and apart from any material unsuitable for scaffolds.
- vii) Couplers should not cause deformation in tubes. Couplers should be made of drop forged steel or equivalent material.

- viii) Tubes should be free from cracks, splits and excessive corrosion and be straight to the eye, and tube ends cut cleanly square with the tube axis.
- ix) Scaffolds should be designed for their maximum load as per relevant code.
- x) Scaffolds should be adequately braced.
- xi) Scaffolds which are not designed to be independent should be rigidly connected to the building at designated vertical and horizontal places.
- xii) A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength.
- xiii) Loose bricks, drainpipes, chimney-pots or other unsuitable material should not be used for the construction or support of any part of a scaffold.
- xiv) Scaffolds should be inspected and certified:
 - (a) before being taken into use;
 - (b) at periodic intervals thereafter as prescribed for different types of scaffolds;
 - (c) after any alteration, interruption in use, exposure to weather or seismic conditions or any other occurrence likely to have affected their strength or stability.
- xv) Inspection should more particularly ascertain that:
 - (a) the scaffold is of suitable type and adequate for the job;
 - (b) materials used in its construction are sound and of sufficient strength;
 - (c) it is of sound construction and stable;
 - (d) that the required safeguards are in position.
- xvi) A scaffold should not be erected, substantially altered or dismantled except by or under the supervision.
- xvii) Every scaffold should be maintained in good and proper condition, and every part should be kept fixed or secured so that no part can be

displaced in consequence of normal use.

- xviii) If out-rigger scaffolding is to be used, it should be specifically designed and inspected before putting in use.

6.2.2 Lifting appliances on scaffolds

- i) When a lifting appliance is to be used on a scaffold:
 - (a) the parts of the scaffold should be carefully inspected to determine the additional strengthening and other safety measures required;
 - (b) any movement of the scaffold members should be prevented;
 - (c) if practicable, the uprights should be rigidly connected to a solid part of the building at the place where the lifting appliance is erected.

6.2.3 Prefabricated scaffolds

- i) In the case of prefabricated scaffold systems, the instructions provided by the manufacturers or suppliers should be strictly adhered to. Prefabricated scaffolds should have adequate arrangements for fixing bracing.
- ii) Frames of different types should not be intermingled in a single scaffold.
- iii) Scaffolding shall be erected on firm and level ground.
- iv) All members of metal scaffolding shall be checked periodically to screen out defective / rusted members. All joints should be properly lubricated for easy tightening.
- v) Entry to scaffolding should be restricted.
- vi) Erection, alteration and removal shall be done under supervision of experienced personnel.
- vii) Use of barrels, boxes, loose bricks etc., for supporting platform shall not be permitted.
- viii) Each supporting member of platform shall be securely fastened and braced
- ix) Where planks are butt-joined, two parallel putlogs shall be used, not

more than 100mm apart, to give support to each plank.

- x) Platform plank shall not project beyond its end support to a distance exceeding 4 times the thickness of plank, unless it is effectively secured to prevent tipping. Cantilever planks should be avoided.
- xi) The platform edges shall be provided with 150mm high toe board to eliminate hazards of tools or other objects falling from platform.
- xii) Erect ladders in the "four up-one out position"
- xiii) Lash ladder securely with the structure.
- xiv) Using non-slip devices, such as, rubber shoes or pointed steel ferules at the ladder foot, rubber wheels at ladder top, fixing wooden battens, cleats etc.
- xv) When ladder is used for climbing over a platform, the ladder must be of sufficient length, to extend at least one meter above the platform, when erected against the platform in "four up-one out position."
- xvi) Portable ladders shall be used for heights not more than 4mt. Above 4mt flights, fixed ladders shall be provided with at least 600 mm landings at every 6mt or less.
- xvii) The width of ladder shall not be less than 300mm and rungs shall be spaced not more than 300mm.
- xviii) Every platform and means of access shall be kept free from obstruction.
- xix) If grease, mud, gravel, mortar etc., fall on platform or scaffolds, these shall be removed immediately to avoid slippage.
- xx) Workers shall not be allowed to work on scaffolds during storms or high wind. After heavy rain or storms, scaffolds shall be inspected before reuse.
- xxi) Don't overload the scaffolding. Remove excess material and scrap immediately.
- xxii) Dismantling of scaffolds shall be done in a pre-planned sequential manner.

6.2.4 Suspended scaffolds/boatwain's chair

- i) In addition to the requirements for scaffolds in general as regards soundness, stability and protection against the risk of falls, suspended scaffolds should meet the following specific requirements.
 - (a) platforms should be designed and built with dimensions that are compatible with the stability of the structure as a whole, especially the length;
 - (b) the number or anchorage should be compatible with the dimensions of the platform;
 - (c) the safety of workers should be safeguarded by an extra rope having a point of attachment independent of the anchorage arrangements of the scaffold;
 - (d) the anchorage and other elements of support of the scaffold should be designed and built in such a way as to ensure sufficient strength;
 - (e) the ropes, winches, pulleys or pulley blocks should be designed, assembled, used and maintained according to the requirements established for lifting gear adapted to the lifting of persons according to national laws and regulations;
 - (f) Before use, the whole structure should be checked by a competent person.

6.2.5 Bamboo Scaffolding

- i) In general, it should be avoided as far as possible. It should not be used in the unit/off-site areas and where hot work is to be done.
- ii) For construction and maintenance of residential and office buildings, situated outside explosive licensed area, bamboo scaffold, if used, should conform to provisions given in IS-3696 (Part 1)-1987.

6.3 STRUCTURAL WORK, LAYING OF REINFORCEMENT & CONCRETING

6.3.1 General provisions

- i) The erection or dismantling of buildings, structures, civil

engineering works, formwork, falsework and shoring should be carried out by trained workers only under the supervision of a competent person.

- ii) Precautions should be taken to guard against danger to workers arising from any temporary state of weakness or instability of a structure.
- iii) Formwork, falsework and shoring should be so designed, constructed and maintained that it will safely support all loads that may be imposed on it.
- iv) Formwork should be so designed and erected that working platforms, means of access, bracing and means of handling and stabilising are easily fixed to the formwork structure.

6.3.2. Erection and dismantling of steel and prefabricated structures

- i) The safety of workers employed on the erection and dismantling of steel and prefabricated structures should be ensured by appropriate means, such as provision and use of:
 - (a) ladders, gangways or fixed platforms;
 - (b) platforms, buckets, boatswain's chairs or other appropriate means suspended from lifting appliances;
 - (c) safety harnesses and lifelines, catch nets or catch platforms;
 - (d) Power-operated mobile working platforms.
- ii) Steel and prefabricated structures should be so designed and made that they can be safely transported and erected.
- iii) In addition to the need for the stability of the part when erected, the design should explicitly take following into account:
 - (a) the conditions and methods of attachment in the operations of transport, storing and temporary support during erection or dismantling as applicable;
 - (b) Methods for the provision of safeguards such as railings and working platforms, and, when necessary, for mounting them

- easily on the structural steel or prefabricated parts.
- iv) The hooks and other devices built in or provided on the structural steel or prefabricated parts that are required for lifting and transporting them should be so shaped, dimensioned and positioned as:
 - (a) to withstand with a sufficient margin the stresses to which they are subjected;
 - (b) Not to set up stresses in the part that could cause failures, or stresses in the structure itself not provided for in the plans, and be designed to permit easy release from the lifting appliance. Lifting points for floor and staircase units should be located (recessed if necessary) so that they do not protrude above the surface;
 - (c) To avoid imbalance or distortion of the lifted load.
 - v) Storeplaces should be so constructed that:
 - (a) there is no risk of structural steel or prefabricated parts falling or overturning;
 - (b) storage conditions generally ensure stability and avoid damage having regard to the method of storage and atmospheric conditions;
 - (c) racks are set on firm ground and designed so that units cannot move accidentally.
 - vi) While they are being stored, transported, raised or set down, structural steel or prefabricated parts should not be subjected to stresses prejudicial to their stability.
 - vii) Every lifting appliance should:
 - (a) be suitable for the operations and not be capable of accidental disconnection;
 - (b) be approved or tested as per statutory requirement.
 - viii) Lifting hooks should be of the self-closing type or of a safety type and should have the maximum permissible load marked on them.
 - ix) Tongs, clamps and other appliances for lifting structural steel and prefabricated parts should:
 - (a) be of such shape and dimensions as to ensure a secure grip without damaging the part;
 - (b) be marked with the maximum permissible load in the most unfavourable lifting conditions.
 - x) Structural steel or prefabricated parts should be lifted by methods or appliances that prevent them from spinning accidentally.
 - xi) When necessary to prevent danger, before they are raised from the ground, structural steel or prefabricated parts should be provided with safety devices such as railings and working platforms to prevent falls of persons.
 - xii) While structural steel or prefabricated parts are being erected, the workers should be provided with appliances for guiding them as they are being lifted and set down, so as to avoid crushing of hands and to facilitate the operations. Use of such appliances should be ensured.
 - xiii) A raised structural steel or prefabricated part should be so secured and wall units so propped that their stability cannot be imperiled, even by external agencies such as wind and passing loads before its release from the lifting appliance.
 - xiv) At work places, instruction should be given to the workers on the methods, arrangements and means required for the storage, transport, lifting and erection of structural steel or prefabricated parts, and, before erection starts, a meeting of all those responsible should be held to discuss and confirm the requirements for safe erection.
 - xv) During transportation within the construction area, attachments such as slings and stirrups mounted on structural steel or prefabricated parts should be securely fastened to the parts.
 - xvi) Structural steel or prefabricated parts should be so transported that the conditions do not affect the stability of the parts or the means of transport result in jolting, vibration or stresses due to blows, or loads of material or persons.

- xvii) When the method of erection does not permit the provision of other means of protection against fall of persons, the workplaces should be protected by guardrails, and if appropriate by toe-boards.
- xviii) When adverse weather conditions such as snow, ice and wind or reduced visibility entail risks of accidents, the work should be carried on with particular care, or, if necessary, interrupted.
- xix) Structures should not be worked on during violent storms or high winds, or when they are covered with ice or snow, or are slippery from other causes.
- xx) If necessary, to prevent danger, structural steel parts should be equipped with attachments for suspended scaffolds, lifelines or safety harnesses and other means of protection.
- xxi) The risks of falling, to which workers moving on high or sloping girders are exposed, should be limited by all means of adequate collective protection or, where this is impossible, by the use of a safety harness that is well secured to a strong support.
- xxii) Structural steel parts that are to be erected at a great height should as far as practicable be assembled on the ground.
- xxiii) When structural steel or prefabricated parts are being erected, a sufficiently extended area underneath the workplace should be barricaded or guarded
- xxiv) Steel trusses that are being erected should be adequately shored, braced or guyed until they are permanently secured in position.
- xxv) Load-bearing structural member should not be dangerously weakened by cutting, holing or other means.
- xxvi) Structural members should not be forced into place by the hoisting machine while any worker is in such a position that he could be injured by the operation.
- xxvii) Open-web steel joists that are hoisted singly should be directly

placed in position and secured against dislodgment.

6.3.3 Reinforcement

- i) Ensure that workers use Personnel Protective equipment like safety helmet, safety shoes, gloves etc.
- ii) Don't place the hand below the rods for checking clear distance. Use measuring devices.
- iii) Don't wear loose clothes while checking the rods.
- iv) Don't stand unnecessarily on cantilever rods.
- v) To carry out welding/cutting of rods, safety procedures/precautions as mentioned in Item No. 6.5 to be followed.
- vi) For supplying of rods at heights, proper staging and/or bundling to be provided.
- vii) Ensure barricading and staging for supplying and fixing of rods at height.
- viii) For short distance carrying of materials on shoulders, suitable pads to be provided.
- ix) While transporting material by trucks/trailers, the rods shall not protrude in front of or by the sides of driver's cabin. In case such protrusion cannot be avoided behind the deck, then it should not extend $1/3^{\text{rd}}$ of deck length or 1.5M whichever is less and tied with red flags/lights.

6.3.4 Concreting

- i) Ensure stability of shuttering work before allowing concreting.
- ii) Barricade the concreting area while pouring at height/depths.
- iii) Keep vibrator hoses, pumping concrete accessories in healthy conditions and mechanically locked.
- iv) Pipelines in concrete pumping system shall not be attached to temporary structures such as scaffolds and formwork support as the forces and movements may effect their integrity.

- v) Check safety cages & guards around moving motors/parts etc. provided in concreting mixers.
- vi) Use Personal Protective Equipment like gloves, safety shoes etc. while dealing with concrete and wear respirators for dealing with cement.
- vii) Earthing of electrical mixers, vibrators, etc. should be done and verified.
- viii) Cleaning of rotating drums of concrete mixers shall be done from outside. Lockout devices shall be provided where workers need to enter.
- ix) Where concrete mixers are driven by internal combustion engine, exhaust points shall be located away from the worker's workstation so as to eliminate their exposure to obnoxious fumes.
- x) Don't allow unauthorised person to stand under the concreting area.
- xi) Ensure adequate lighting arrangements for carrying out concrete work during night.
- xii) Don't allow the same workers to pour concrete round the clock. Insist on shift pattern.
- xiii) During pouring, shuttering and its supports should be continuously watched for defects.

6.4 ROAD WORK

- 6.4.1 Site shall be barricaded and provided with warning signs, including night warning lamps at appropriate locations for traffic diversion.
- 6.4.2 Filled and empty bitumen drums shall be stacked separately at designated places.
- 6.4.3 Mixing aggregate with bitumen shall preferably be done with the help of bitumen batch mixing plant, unless operationally non-feasible.
- 6.4.4 Road rollers, Bitumen sprayers, Pavement finishers shall be driven by experienced drivers with valid driving license.
- 6.4.5 Workers handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen

with aggregate, shall be provided with PVC hand gloves and rubber shoes with legging up to knee joints.

- 6.4.6 At the end of day's work, surplus hot bitumen in tar boiler shall be properly covered by a metal sheet, to prevent anything falling in it,
- 6.4.7 If bitumen accidentally falls on ground, it shall be immediately covered by sprinkling sand, to prevent anybody stepping on it. Then it shall be removed with the help of spade.
- 6.4.8 For cement concrete roads, besides site barricading and installation of warning signs for traffic diversion, safe practices mentioned in the chapter on "Concreting", shall also be applicable.

6.5 CUTTING/WELDING

- 6.5.1 Common hazards involved in welding/cutting are sparks, molten metal, flying particles, harmful light rays, electric shocks etc. Following precautions should be taken: -
 - i) A dry chemical type fire extinguisher shall be made available in the work area.
 - ii) Adequate ventilation shall be ensured by opening manholes and fixing a shield or forced circulation of air etc, while doing a job in confined space.
 - iii) Ensure that only approved and well-maintained apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used.
 - iv) All covers and panels shall be kept in place, when operating an electric Arc welding machine.
 - v) The work piece should be connected directly to Power supply, and not indirectly through pipelines/structures/equipments etc.
 - vi) The welding receptacles shall be rated for 63 A suitable for 415V, 3-Phase system with a scraping earth. Receptacles shall have necessary mechanical interlocks and earthing facilities.
 - vii) All cables, including welding and ground cables, shall be checked for

- any worn out or cracked insulation before starting the job. Ground cable should be separate without any loose joints.
- viii) Cable coiling shall be maintained at minimum level, if not avoidable.
 - ix) An energised electrode shall not be left unattended.
 - x) The power source shall be turned off at the end of job.
 - xi) All gas cylinders shall be properly secured in upright position.
 - xii) Acetylene cylinder shall be turned and kept in such a way that the valve outlet points away from oxygen cylinder.
 - xiii) Acetylene cylinder key for opening valve shall be kept on valve stem, while cylinder is in use, so that the acetylene cylinder could be quickly turned off in case of emergency. Use flash back arrestors to prevent back-fire in acetylene/oxygen cylinder.
 - xiv) When not in use, valves of all cylinders shall be kept closed.
 - xv) All types of cylinders, whether full or empty, shall be stored at cool, dry place under shed.
 - xvi) Forced opening of any cylinder valve should not be attempted.
 - xvii) Lighted gas torch shall never be left unattended.
 - xviii) Store acetylene and oxygen cylinders separately.
 - xix) Store full and empty cylinders separately.
 - xx) Avoid cylinders coming into contact with heat.
 - xxi) Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge but never dragged.
 - xxii) If cylinders have to be moved, be sure that the cylinder valves are shut off.
 - xxiii) Before changing torches, shut off the gas at the pressure reducing regulators and not by crimping the hose.
 - xxiv) Do not use matches to light torches, use a friction lighter.
 - xxv) Move out any leaking cylinder immediately.
 - xxvi) Use trolleys for oxygen & acetylene cylinder and chain them.
 - xxvii) Always use Red hose for acetylene and other fuel gases and Black for oxygen, and ensure that both are in equal length.
 - xxviii) Ensure that hoses are free from burns, cuts and cracks and properly clamped.
 - xxix) Avoid dragging hoses over sharp edges and objects
 - xxx) Do not wrap hoses around cylinders when in use or stored.
 - xxxi) Protect hoses from flying sparks, hot slag, and other hot objects.
 - xxxii) Lubricants shall not be used on Ox-fuel gas equipment.
 - xxxiii) During cutting/welding, use proper type goggles/face shields.
- ## 6.6 WORKING IN CONFINED SPACES
- ### 6.6.1 Following safety practices for working in confined space like towers, columns, tanks and other vessels should be followed in addition to the safety guidelines for specific jobs like scaffolding, cutting/welding etc.
- i) Shut down, isolate, depressurise and purge the vessel as per laid down procedures.
 - ii) Entry inside the vessel and to carry out any job should be done after issuance of valid permit only in line with the requirement of OISD-STD-105.
 - iii) Ensure proper and accessible means of exit before entry inside a confined space.
 - iv) The number of persons allowed inside the vessel should be limited to avoid overcrowding.
 - v) When the work is going on in the confined space, there should always be one man standby at the nearby manway.

- vi) Before entering inside the vessels underground or located at lower elevation, probability of dense vapours accumulating nearby should also be considered in addition to inside the vessel.
- vii) Ensure requisite O₂ level before entry in the confined space and monitor level periodically or other wise use respiratory devices.
- viii) Check for no Hydrocarbon or toxic substances before entry and monitor level periodically or use requisite Personal Protective Equipment.
- ix) Ensure adequate ventilation or use respiratory devices.
- x) Depending upon need, necessary respirator system, gas masks and suit shall be worn by everyone entering confined space. In case of sewer, OWS or in the confined area where there is a possibility of toxic or inert gas, gas masks shall be used by everyone while entering.
- xi) Barricade the confined spaces during hoisting, radiography, blasting, pressure testing etc.
- xii) Use 24V flameproof lamp fittings only for illumination.
- xiii) Use tools with air motors or electric tools with maximum voltage of 24V.
- xiv) House keeping shall be well maintained.
- xv) Safety helmet, safety shoes and safety belt shall be worn by everyone entering the confined space.
- xvi) Don't wear loose clothing while working in a confined space.
- xvii) In case of the vessels which are likely to contain pyrophoric substances (like Iron Sulphide), special care need to be taken before opening the vessel. Attempt should be made to remove the pyrophoric substances. Otherwise, these should be always kept wet by suitable means.
- xviii) The cutting torches should also be kept outside the vessel immediately after the cutting.
- xix) The gas cylinders used for cutting/welding shall be kept outside.
- xx) All cables, hoses, welding equipment etc., shall be removed from confined space at end of each work day, even if the work is to be resumed in the same space the next day.
- xxi) To the extent possible sludge shall be cleared and removed from outside before entering.
- xxii) No naked light or flame or hot work such as welding, cutting and soldering should be permitted inside a confined space or area unless it has been made completely free of the flammable atmosphere, tested and found safe by a competent person. Only non-sparking tools and flameproof hand lamps protected with guard and safety torches should be used inside such confined space or area for initial inspection, cleaning or other work required to be done for making the area safe.
- xxiii) Communication should be always maintained between the worker and the attendant.

6.7 PROOF/PRESSURE TESTING

- 6.7.1 Review test procedure before allowing testing with water or air or any other fluid.
- 6.7.2 Provide relief valves of adequate size while testing with air or other gases.
- 6.7.3 Ensure compliance of necessary precautions, step wise loading, tightening of fasteners, grouting etc. before and during testing.
- 6.7.4 Inform all concerned in advance of the testing.
- 6.7.5 Keep the vents open before opening any valve for filling/draining of liquid used for hydrotesting. The filling/draining should not exceed the designed rate for pressure testing.
- 6.7.6 Provide separate gauges of suitable range for pressurising pump and the equipment to be tested.
- 6.7.7 Provide gauges at designated locations for monitoring of pressures.

6.7.8 Check the calibration of all pressurising equipment and accessories and maintain records.

6.7.9 Take readings at pre-defined intervals.

6.8 WORKING AT HEIGHTS

6.8.1 General Provision

- i) While working at a height of more than 3 meters, ISI approved safety belt shall be used.
- ii) While working at a height of more than 3 meters, permit should be issued by competent person before commencement of the job.
- iii) Worker should be well trained on usage of safety belt including its proper usage at the time of ascending/descending.
- iv) All tools should be carried in tool kits to avoid their falling.
- v) If the job is on fragile/sloping roof, roof walk ladders shall be used.
- vi) Provide lifeline wherever required.
- vii) Additional safety measures like providing Fall Arrestor type Safety belt, safety net should be provided depending upon site conditions, job requirements.
- viii) Keep working area neat and clean. Remove scrap material immediately.
- ix) Don't throw or drop material/equipment from height.
- x) Avoid jumping from one member to another. Use proper passageway.
- xi) Keep both hands free while climbing. Don't try to bypass the steps of the ladder.
- xii) Try to maintain calm at height. Avoid over exertion.
- xiii) Avoid movements on beam.
- xiv) Elevated workplaces including roofs should be provided with safe means of access and egress such as stairs, ramps or ladders.

6.8.2 Roof Work

- i) All roof-work operations should be pre-planned and properly supervised.

ii) Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.

iii) Work on roofs shouldn't be carried on in weather conditions that threaten the safety of workers.

iv) Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.

v) Roofing brackets should fit the slope of the roof and be securely supported.

vi) Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.

vii) On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.

viii) All covers for openings in roofs should be of substantial construction and be secured in position.

ix) Roofs with a pitch of more than 10 should be treated as sloping.

x) When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured in position.

xi) During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off the roof.

xii) Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and when spanning across the supports for the roof covering to support those workers.

xiii) A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

6.8.3 Work on tall chimneys

- i) For the erection and repair of tall chimneys, scaffolding should be provided. A safety net should be maintained at a suitable distance below the scaffold.
- ii) The scaffold floor should always be at least 65 cm below the top of the chimney.
- iii) Under the working floor of the scaffolding the next lower floor should be left in position as a catch platform.
- iv) The distance between the inside edge of the scaffold and the wall of the chimney should not exceed 20 cm at any point.
- v) Catch platforms should be erected over:
 - (a) the entrance to the chimney;
 - (b) Passageways and working places where workers could be endangered by falling objects.
- vi) For climbing tall chimneys, access should be provided by:
 - (a) stairs or ladders;
 - (b) a column of iron rungs securely embedded in the chimney wall;
 - (c) Other appropriate means.
- vii) When workers use the outside rungs to climb the chimney, a securely fastened steel core rope looped at the free end and hanging down at least 3 m should be provided at the top to help the workers to climb on to the chimney.
- viii) While work is being done on independent chimneys the area surrounding the chimney should be enclosed by fencing at a safe distance.
- ix) Workers employed on the construction, alteration, maintenance or repair of tall chimneys should not:
 - a) work on the outside without a safety harness attached by a lifeline to a rung, ring or other secure anchorage;
 - b) put tools between the safety harness and the body or in pockets not intended for the purpose;
 - c) haul heavy materials or equipment up and down by hand to or from the workplace on the chimney;
 - d) fasten pulleys or scaffolding to reinforcing rings without first verifying their stability;
 - e) work alone;
 - f) climb a chimney that is not provided with securely anchored ladders or rungs;
 - g) Work on chimneys in use unless the necessary precautions to avoid danger from smoke and gases have been taken.
- x) Work on independent chimneys should not be carried on in high winds, icy conditions, fog or during electrical storms.

6.9 HANDLING AND LIFTING EQUIPMENT:

6.9.1 General Provisions

Following are the general guidelines to be followed with regard to all types of handling and lifting equipment in addition to the guidelines for specific type of equipments dealt later on.

- i) There should be a well-planned safety programme to ensure that all the lifting appliances and lifting gear are selected, installed, examined, tested, maintained, operated and dismantled with a view to preventing the occurrence of any accident;
- ii) All lifting appliances shall be examined by competent persons at frequencies as specified in "The Factories act".
- iii) Check thoroughly quality, size and condition of all lifting tools like chain pulley blocks, slings, U-clamps, D-shackles etc. before putting them in use.
- iv) Safe lifting capacity of all lifting & handling equipment, tools and shackles should be got verified and certificates obtained from competent authorities before its use. The safe working load shall be marked on them.
- v) Check periodically the oil, brakes, gears, horns and tyre pressure of all moving equipments like cranes,

- forklifts, trailers etc as per manufacturer's recommendations.
- vi) Check the weights to be lifted and accordingly decide about the crane capacity, boom length and angle of erection.
 - vii) Allow lifting slings as short as possible and check packing at the friction points.
 - viii) While lifting/placing of the load, no unauthorised person shall remain within the radius of the boom and underneath the load.
 - ix) While loading, unloading and stacking of pipes, proper wedges shall be placed to prevent rolling down of the pipes.
 - x) Control longer jobs being lifted up from both ends.
 - xi) Only trained operators and riggers should carry out the job. While the crane is moving or lifting the load, the trained rigger should be there for keeping a vigil against hitting any other object.
 - xii) During high wind conditions and nights, lifting of heavy equipments should be avoided. If unavoidable to do erection in night, operator and rigger should be fully trained for night signaling. Also proper illumination should be there.
 - xiii) Allow crane to move on hard, firm and leveled ground.
 - xiv) When crane is in idle condition for long periods or unattended, crane boom should either be lowered or locked as per manufacturer's guidelines.
 - xv) Hook and load being lifted shall remain in full visibility of crane operators, while lifting, to the extent possible.
 - xvi) Don't allow booms or other parts of crane to come within 3 meters reach of overhead electrical cables.
 - xvii) No structural alterations or repairs should be made to any part of a lifting appliance, which may affect the safety of the appliance without the permission and supervision of the competent person.

6.9.2 Hoists

- i) Hoist shafts should be enclosed with rigid panels or other adequate fencing at:
 - (a) ground level on all sides;
 - (b) all other levels at all points at which access is provided;
 - (c) all points at which persons are liable to be struck by any moving part.
- ii) The enclosure of hoist shafts, except at approaches should extend where practicable at least 2mt above the floor, platform or other place to which access is provided except where a lesser height is sufficient to prevent any person falling down the hoistway and there is no risk of any person coming into contact with any moving part of the hoist, but in no case should the enclosure be less than 1mt in height.
- iii) The guides of hoist platforms should offer sufficient resistance to bending and, in the case of jamming by a safety catch, to buckling.
- iv) Where necessary to prevent danger, adequate covering should be provided above the top of hoist shafts to prevent material falling down them.
- v) Outdoor hoist towers should be erected on firm foundations, and securely braced, guyed and anchored.
- vi) A ladderway should extend from the bottom to the top of outdoor hoist towers, if no other ladderway exists within easy reach.
- vii) Hoisting engines should be of ample capacity to control the heaviest load that they will have to move.
- viii) Hoists should be provided with devices that stop the hoisting engine as soon as the platform reaches its highest stopping place.
- ix) Winches should be so constructed that the brake is applied when the control handle is not held in the operating position.
- x) It should not be possible to set in motion from the platform a hoist, which is not designed for the conveyance of persons.

- xi) Winches should not be fitted with pawl and ratchet gears on which the pawl must be disengaged before the platform is lowered.
 - xii) Hoist platforms should be capable of supporting the maximum load that they will have to carry with a safety factor.
 - xiii) Hoist platforms should be equipped with safety gear that will hold the platform with the maximum load if the hoisting rope breaks.
 - xiv) If workers have to enter the cage or go on the platform at landings there should be a locking arrangement preventing the cage or platform from moving while any worker is in or on it.
 - xv) On sides not used for loading and unloading, hoist platforms should be provided with toe-boards and enclosures of wire mesh or other suitable material to prevent the fall of parts of loads.
 - xvi) Where necessary to prevent danger from falling objects, hoist platforms should be provided with adequate covering.
 - xvii) Counterweights consisting of an assemblage of several parts should be made of specially constructed parts rigidly connected together.
 - xviii) Counterweights should run in guides.
 - xix) Platforms should be provided at all landings used by workers.
 - xx) Following notices should be posted up conspicuously and in very legible characters:
 - (a) on all hoists:
 - on the platform: the carrying capacity in kilograms or other appropriate standard unit of weight;
 - on the hoisting engine: the lifting capacity in kilograms or other appropriate standard unit of weight;
 - (b) on hoists authorised or certified for the conveyance of persons:
 - on the platform or cage: the maximum number of persons to be carried at one time;
 - (c) on hoists for goods only:
 - on every approach to the hoist and on the platform: prohibition of use by persons.
 - xxi) Hoists intended for the carriage of persons should be provided with a cage so constructed as to prevent any person from falling out or being trapped between the cage and any fixed part of the structure when the cage gate is shut, or from being struck by the counterbalance weight or by articles or materials tailing down the hoistway.
 - xxii) On each side in which access is provided, the cage should have a gate fitted with devices which ensure that the gate cannot be opened except when the cage is at a landing and that the gate must be closed before the cage can move away from the landing.
 - xxiii) Every gate in the enclosure of the hoist shaft which gives access from a landing place to the cage should be fitted with devices to ensure that the gate cannot be opened except when the cage is at that landing place, and that the cage cannot be moved away from that landing place until the gate is closed.
- 6.9.3 Derricks**
- Stiff-leg derricks**
- i) Derricks should be erected on a firm base capable of taking the combined weight of the crane structure and maximum rated load.
 - ii) Devices should be used to prevent masts from lifting out of their seating.
 - iii) Electrically operated derricks should be effectively earthed from the sole plate or framework.
 - iv) Counterweights should be so arranged that they do not subject the backstays, sleepers or pivots to excessive strain.
 - v) When derricks are mounted on wheels:

- a) a rigid member should be used to maintain the correct distance between the wheels;
 - b) they should be equipped with struts to prevent them from dropping if a wheel breaks or the derrick is derailed.
- vi) The length of a derrick jib should not be altered without consulting the manufacturer.
 - vii) The jib of a scotch derrick crane should not be erected within the backstays of the crane.

Guy derricks

- i) The restraint of the guy ropes should be ensured by fitting stirrups or anchor plates in concrete foundations.
- ii) The mast of guy derricks should be supported by six top guys spaced approximately equally.
- iii) The spread of the guys of a guy derrick crane from the mast should not be more than 45° from the horizontal.
- iv) Guy ropes of derricks should be equipped with a stretching screw or turnbuckle or other device to regulate the tension.
- v) Gudgeon pins, sheave pins and fool bearings should be lubricated frequently.
- vi) When a derrick is not in use, the boom should be anchored to prevent it from swinging.

6.9.4 Gin poles

- i) Gin poles should:
 - (a) be straight;
 - (b) consist of steel or other suitable metal;
 - (c) be adequately guyed and anchored;
 - (d) be vertical or raked slightly towards the load;
 - (e) be of adequate strength for the loads that they will be required to lift/move.
- ii) Gin poles should not be spliced and if a gin pole is composed of different elements, they should be assembled in conformity with their intrinsic material strength.

- iii) Gin poles should be fastened at their feet to prevent displacement in operation.
- iv) Gin poles, which are moved from place to place and re-erected, should not be taken into use again before the pole, lifting ropes, guys, blocks and other parts have been inspected, and the whole appliance has been tested under load.
- v) When platforms or skips are hoisted by gin poles, precautions should be taken to prevent them from spinning and to provide for proper landing.

6.9.5 Tower cranes

- i) Where tower cranes have cabs at high level, persons, capable and trained to work at heights, should only be employed as crane operators.
- ii) The characteristics of the various machines available should be considered against the operating requirements and the surroundings in which the crane will operate before a particular type of crane is selected.
- iii) Care should be taken in the assessment of wind loads both during operations and out of service. Account should also be taken of the effects of high structures on wind forces in the vicinity of the crane.
- iv) The ground on which the tower crane stands should have the requisite bearing capacity. Account should be taken of seasonal variations in ground conditions.
- v) Bases for tower cranes and tracks for rail-mounted tower cranes should be firm and level. Tower cranes should only operate on gradients within limits specified by the manufacturer. Tower cranes should only be erected at a safe distance from excavations and ditches.
- vi) Tower cranes should be sited where there is clear space available for erection, operation and dismantling. As far as possible, cranes should be sited so that loads do not have to be handled over occupied premises, over public thoroughfares, other construction works and railways or near power cables.

- vii) Where two or more tower cranes are sited in positions where their jibs could touch any part of the other crane, there should be direct means of communication between them and a distinct warning system operated from the cab so that one driver may alert the other of impending danger.
- viii) The manufacturers' instructions on the methods and sequence of erection and dismantling should be followed. The crane should be tested before being taken into use.
- ix) The climbing operation of climbing tower cranes should be carried out in accordance with manufacturers' instructions. The free-standing height of the tower crane should not extend beyond what is safe and permissible in the manufacturers' instructions.
- x) When the tower crane is left unattended, loads should be removed from the hook, the hook raised, the power switched off and the boom brought to the horizontal. For longer periods or at times when adverse weather conditions are expected, out of service procedures should be followed. The main jib should be slewed to the side of the tower away from the wind, put into free slew and the crane immobilised.
- xi) A windspeed measuring device should be provided at an elevated position on the tower crane with the indicator fitted in the drivers' cab.
- xii) Devices should be provided to prevent loads being moved to a point where the corresponding safe working load of the crane would be exceeded. Name boards or other items liable to catch the wind should not be mounted on a tower crane other than in accordance with the manufacturers' instructions.
- xiii) Tower cranes should not be used for magnet, or demolition ball service, piling operations or other duties, which could impose excessive loading on the crane structure.

6.9.6 Lifting ropes

- i) Only ropes with a known safe working capacity should be used as lifting ropes.
- ii) Lifting ropes should be installed, maintained and inspected in accordance with manufacturers' instructions.
- iii) Repaired steel ropes should not be used on hoists.
- iv) Where multiple independent ropes are used, for the purpose of stability, to lift a work platform, each rope should be capable of carrying the load independently.

6.10 VEHICLE MOVEMENT

- 6.10.1 Park vehicles only at designated places. Don't block roads to create hindrance for other vehicles.
- 6.10.2 Don't overload the vehicle.
- 6.10.3 Obey speed limits and traffic rules.
- 6.10.4 Always expect the unexpected and be a defensive driver.
- 6.10.5 Drive carefully during adverse weather and road conditions.
- 6.10.6 Read the road ahead and ride to the left.
- 6.10.7 Be extra cautious at nights. Keep wind screens clean and lights in working condition.
- 6.10.8 All vehicles used for carrying workers and construction materials must undergo predictive/preventive maintenance and daily checks
- 6.10.9 Driver with proper valid driving license shall only be allowed to drive the vehicle
- 6.10.10 Routes shall be leveled, marked and planned in such a way so as to avoid potential hazards such as overhead power lines and sloping ground etc.
- 6.10.11 While reversing the vehicles, help of another worker should be ensured at all times
- 6.10.12 An unattended vehicle should have the engine switched off
- 6.10.13 Wherever possible one-way system shall be followed
- 6.10.14 Barriers/fixed stops should be provided for excavation/openings to prevent fall of vehicle

- 6.10.15 Load should be properly secured
- 6.10.16 The body of the tipper lorry should always be lowered before driving the vehicle off.
- 6.10.17 Signs/signals/caution boards etc. should be provided on routes .

6.11 ELECTRICAL

6.11.1 General Provisions

- i) Only persons having valid licenses should be allowed to work on electrical facilities.
- ii) No person should be allowed to work on live circuit. The same, if unavoidable, special care and authorisation need to be taken.
- iii) Treat all circuits as "LIVE" unless ensured otherwise.
- iv) Electrical "Tag Out" procedure "MUST" be followed for carrying out maintenance jobs.
- v) Display voltage ratings prominently with "Danger" signs.
- vi) Put caution/notice signs before starting the repair works.
- vii) All electrical equipment operating above 250V shall have separate and distinct connections to earth grid.
- viii) Proper grounding to be ensured for all switch boards and equipment including Portable ones prior to taking into service.
- ix) Make sure that electrical switch boards, portable tools, equipments (like grinding machine etc.) don't get wet during their usage. If it happens, stop the main supply, make the tools dry and then only use them. Check proper earthing.

All temporary switch boards/ KIOSKS put up at work site should be suitably protected from rain and the level of same should be high enough to avoid contact with water due to water logging.
- x) Don't work wet on electrical system.
- xi) Don't overload the electrical system.
- xii) Use only proper rated HRC fuses.
- xiii) Industrial type extension boards and Plug sockets are only to be used.
- xiv) ELCB for all temporary connections must be provided. Use insulated 3-pin plug tops.
- xv) All power supply cables should be laid properly and neatly so that they don't cause hindrance to persons working and no physical damage also takes place to the cables during various construction activities.
- xvi) All Power cables to be properly terminated using glands and lugs of proper size and adequately crimped.
- xvii) Use spark-proof/flame proof type electrical fittings in Fire Hazard zones as per area classification under OISD-STD-113.
- xviii) Check installations of steel plates/pipes to protect underground cables at crossings.
- xix) Don't lay unarmored cable directly on ground, wall, roof or trees. All temporary cables should be laid at least 750 mm below ground and cable markers should be provided. Proper sleeves should be provided at road crossings. In case temporary cables are to be laid on wooden poles/steel poles, the minimum cable heights should be 4.5 M.
- xx) Maintain safe overhead distance of HT cables as per Indian Electricity Rules and relevant acts.
- xxi) Don't connect any earthing wire to the pipelines/structures.
- xxii) Don't make any unsafe temporary connections, naked joints/wiring etc.
- xxiii) Ensure that temporary cables are free from cuts, damaged insulation, kinks or improper insulated joints.
- xxiv) Check at periodic intervals that pins of sockets and joints are not loose.
- xxv) Protect electrical wires/equipments from water and naked flames.
- xxvi) Illuminate suitably all the work areas.
- xxvii) All switchboards should be of MS structure only and incoming source should be marked.
- xxviii) Hand lamps should not be of more than 24V rating.
- xxix) Fire extinguishers (DCP/CO₂/Sand buckets) should be kept near

temporary switch boards being used for construction purposes. Don't use water for fighting electrical fires.

xxx) Insulating mats shall be provided in the front and back end of switch boards.

xxxi) All parts of electrical installations should be so constructed, installed and maintained as to prevent danger of electric shock, fire and external explosion.

Periodic checking/certification of electrical safety appliances such as gloves, insulating mats, hoods etc. to be done/witnessed along with maintaining a register at site signed by competent authority.

xxxii) A notice displaying following, should be kept exhibited at suitable places:

- a) prohibiting unauthorised persons from entering electrical equipment rooms or from handling or interfering with electrical apparatus;
- b) containing directions as to procedures in case of fire, rescue of persons in contact with live conductors and the restoration of persons suffering from electric shock;
- c) specifying the person to be notified in case of electrical accident or dangerous occurrence, and indicating how to communicate with him.

xxxiii) No other cables/pipes to be laid in trench used for electrical cables.

xxxiv) Utmost care should be taken while excavating Earth from cable trench to avoid damage or any accident.

xxxv) Sub-station floor cut-outs meant for switch board installations to be covered wherever installation is incomplete.

NOTE: A Residual Current Operated Circuit Breaker (RCCB) or Earth Leakage Circuit Breaker (ELCB), when installed, protects a human being to the widest extent. RCCB or ELCB should be provided as per Indian Electricity Rules.

6.11.2 Inspection and maintenance

i) All electrical equipment should be inspected before taking into use to

ensure suitability for its proposed use.

ii) At the beginning of every shift, the person using the electrical equipment should make a careful external examination of the equipment and conductors, especially the flexible cables.

iii) Apart from some exceptional cases, work on or near live parts of electrical equipment should be forbidden.

iv) Before any work is begun on conductors or equipment that do not have to remain live:

- a) the current should be switched off by a responsible authorised person;
- b) precautions should be taken to prevent the current from being switched on again;
- c) the conductors or the equipment should be tested to ascertain that they are dead;
- d) the conductors and equipment should be earthed and short-circuited;
- e) neighbouring live parts should be adequately protected against accidental contact.

v) After work has been done on conductors and equipment, the current should only be switched on again on the orders of a competent person after the earthing and short-circuiting have been removed and the workplace reported safe.

vi) Electricians should be provided with approved and tested tools, and personal protective equipment such as rubber gloves, mats etc.

vii) All conductors and equipment should be considered to be live unless there is a proof of the contrary.

viii) When work has to be done in dangerous proximity to live parts the current should be cut off. If for operational reasons this is not possible, the live parts should be fenced off or enclosed by qualified staff from the sub-station concerned.

6.11.3. Testing

- i) Electrical installations should be inspected and tested and the results recorded.
- ii) Periodic testing of the efficiency of the earth leakage protective devices should be carried out.
- iii) Particular attention should be paid to the earthing of apparatus, the continuity of protective conductors, polarity and insulation resistance, protection against mechanical damage and condition of connections at points of entry.

6.12 OFFSHORE

6.12.1 General

The isolated nature of offshore installations are hazardous. They call for greater need for safety and survival at offshore. Safety at offshore is safety of installations and safety of personnel. Safety problems and accidents at offshore have high risks due to limited space, helicopter operation, sea transport etc. Following are the general safety guidelines to be followed in addition to the safety guidelines stipulated for specific jobs dealt later on:

- i) Workers should be well trained to do their job independently with high degree of self-control and self-discipline.
- ii) On arrival at offshore, everyone should be briefed about the safety rules to be followed at offshore, evacuation system etc. All personnel should wear overall (dangri), helmet and shoes for personnel protection.
- iii) In case of emergency, workers should follow instruction of Field Production Superintendent (F.P.S.) In certain cases instructions may be given to abandon the offshore installation and evacuate the persons to safe location.
- iv) To overcome above problems, offshore personnel must receive training for using life saving appliances and other personal survival techniques.
- v) Any person working at offshore should have one person as standby for any eventuality.

6.12.2 Drilling Rigs

- i) Location of jack up rigs should not be less than 5 Kms from shipping route. Orientation of the rig, wind direction etc are required for safe landing of helicopter. Information w.r.t. sea currents, wind speed, Hi-lo tide etc are required for mooring of supply vessels.
- ii) Sea bed condition at every location should be ensured for safety of rig.
- iii) Radio and other communication facilities should be such to maintain contact with base all times.
- iv) During toeing of rig, the rig deck should be clear of load, toeing lines should be in good condition and tensions in various toeing lines should be constantly monitored.
- v) Few steps during toeing are:
 - a) crane booms should be secured to their veta,
 - b) all hatches and water tight doors should be closed,
 - c) number of personnel on board should be restricted,
 - d) evacuate in case of emergency and operation should be completed preferably in day light.

6.12.3 Drilling

- i) In view of CO₂ and H₂S gas cut from well, effective ventilation should be provided where drilling is in progress.
- ii) Safety alarm shall be checked in advance in view of failure of ventilation system.
- iii) Suitable sensors for H₂S and Methane should be function tested time to time and suitable colour code should be given.
- iv) Working areas of the crane should be illuminated during night to avoid accident.
- v) Clear space should be available for despatch and receipt of load and, in particular, basket transfer of passengers. Persons engaged in loading/unloading of materials should be protected from falling into the sea.

- vi) Signal light should be fitted at the top of the jib.
- vii) Crane hook should be fitted with safety latches.
- viii) Experienced person should be engaged in operation of specific equipment like winches, cranes etc.
- ix) At least three cable turns shall always be there on the winch drum.
- x) Adequate communication like walkie talkie, round robin phone should be available between the crane operator, supervisor and helper.
- xi) Crane operation should be completely stopped during helicopter landing/taking off.
- xii) Except for helicopter landing deck, all decks, platforms, bridges, ladders should have rigid and fixed guard rails atleast one meter high and should have one intermediate rail midway between the handrail and 100 mm toe board.
- xiii) Wooden ladders shall not be used at offshore.
- xiv) Flow sensor in the flow line should be ensured for safe working and to avoid blow out.
- xv) Hydrogen sulphide gas In offshore is of great risk and at 10 ppm (0.001%) concentration in air, a person should not be exposed for more than 8 hours, If concentration is more, then breathing apparatus should be used. Corrosion of equipment is also caused by H₂S.
- xvi) Portable H₂S gas detector should be continuously used.
- iii) Surface safety valve or SDV should be checked for no gas leakage from bleed port / flange etc., in the well head area. It should not be in "mechanical override" or bypassed from panel.
- iv) High pressure gas lift lines - blowdown system should be O.K.
- v) Auto actuation of SDVs in the inlet of pressure vessels should be O.K. and in "normal position" from shutdown panels. A record of status of switches normal/bypassed in auto-con* panels (PSH, PSL, LSL, ILSL) should be maintained.

*** Shut Down Panels**

6.12.4 Production Platforms

- i) In case hydrocarbon is released due to overpressure, leak, overflow, gas blow etc., shut down process to stop flow of hydrocarbon. Prevent ignition of released hydrocarbon and in case of fire shut in the process complex and follow emergency contingency plan.
- ii) Sub surface safety valve (SSSV) below the well head should be actuated during uncontrolled well - flow and they should be regularly checked.
- vi) Welders rectifier set and electrical connections to it should be checked and approved by electrical-in-charge for proper electrical safety.
- vii) "SCADA" telemetry system if available should be operational for remote opening and closing of wells at unmanned platforms (through RPMC).
- viii) Local ESD/FSD (near the work site) should be provided for jobs of very critical nature, so that the persons working can access it immediately in emergency for safety. Safety officer should judge the requirement & inform FPS for the same.
- ix) Railings and Gratings etc. in and around work area should be O.K. and inspected to avoid slippage of man into sea.
- x) Emergency shut down (ESD) system is initiated when an abnormal condition is detected. ESD should be checked once in six months.
- xi) Platform should be manned round the clock.
- xii) Welding and cutting work should be regulated by hot work permit.
- xiii) All detectors should be calibrated as per recommendation of the manufacturer.
- xiv) No system should be by-passed which affects the system of platform.

- xv) In H₂S field platforms, due care shall be taken as per recommendations.
- xvi) Follow the instructions of F.P.S. during stay at platform

6.12.5 Fire Prevention And Control

- i) Provision be made for safe handling and storage of dirty rags, trash, and waste oil. Flammable liquids and chemicals applied on platform should be immediately cleaned.
- ii) Paint containers and hydrocarbon samples, gas cylinders for welding and cutting should be stored properly. Cylinders should be transported in hand-cart.
- iii) Smoking should be restricted and no smoking area should be identified.
- iv) Special attention should be given to crude oil pump seals, diesel and gas engines which are potential source of ignition in the event of failure.
- v) Fire and smoke detectors i.e. ultraviolet heat, thermal and smoke detector should be function tested once in three months.
- vi) Fire is controlled in offshore by water spraying, Halon, CO₂ flooding, DCP and sprinkler system.
- vii) Foaming agent is applied for controlling fire in liquid hydrocarbon. The system is not effective in gas fire.
- viii) Light weight breathing system should be used.
- ix) The fire control plan at offshore should reveal control station, fire alarms and fire detectors, deluge valves and sprinkler, fire extinguishing appliances, fireman outfit and ventilation system.
- x) Fire fighting equipment should be maintained in ready to use condition.

6.12.6 Life Saving Appliances

- i) Life boats with a speed of 6 knots and carrying capacity upto 50 persons are used in offshore.
- ii) No. of life boats on one installation should have a capacity to

accommodate twice the number of persons onboard installation.

- iii) Launching appliances and life boat equipment should be checked every week.
- iv) Boat landing areas should be adequately illuminated.
- v) Life raft has no power and they rely on drift.
- vi) Life jacket lifts the wearer after entering water.
- vii) Life buoys are used to rescue persons if any person accidentally falls in the sea.
- viii) All life saving appliances should be inspected by the MMD surveyor /sr. officials once a year.
- ix) Every life boat shall be inspected once a week.
- x) Every life boat and life raft should be serviced once a year by a competent authority,

6.12.7 Safety Precautions during Helicopter Transportation

- i) Passenger briefing regarding safety rules while travelling in helicopter should be carried out before boarding the helicopter.
- ii) Emergency procedure should be briefed to all the passenger In case helicopter is to ditch into the sea.
- iii) Heli-pad should have a non-skid surface. Nylon rope net should be stretched on the deck.
- iv) Proper drainage should be available on helideck.
- v) There should be no obstruction on the helideck itself and within 3 meters of its parameter. Closest super structure above the helideck should have red obstruction light.
- vi) While landing fire crew of two persons should be standby adjacent to helideck.
- vii) Heli-deck should be properly illuminated for night landing.
- viii) During switching off helicopter, persons should not be allowed to go out/ towards helicopter

6.13 DEMOLITION

6.13.1. General provisions

- i) When the demolition of any building or structure might present danger to workers or to the public:
 - (a) necessary precautions, methods and procedures should be adopted, including those for the disposal of waste or residues;
 - (b) the work should be planned and undertaken only under the supervision of a competent person.
- ii) Before demolition operations begin:
 - (a) structural details and builders' drawings should be obtained wherever possible;
 - (b) details of the previous use should be obtained to identify any possible contamination and hazards from chemicals, flammables, etc.;
 - (c) an initial survey should be carried out to identify any structural problems and risks associated with flammable substances and substances hazardous to health. The survey should note the type of ground on which the structure is erected, the condition of the roof trusses, the type of framing used in framed structures and the load-bearing walls;
 - (d) a method of demolition should be formulated after the survey and recorded in a method statement having taken all the various considerations into account and identifying the problems and their solutions;
- iii) All electric, gas, water and steam service lines should be shut off and, as necessary, capped or otherwise controlled at or outside the construction site before work commences.
- iv) If it is necessary to maintain any electric power, water or other services during demolition operations, they should be adequately protected against damage.
- v) As far as practicable, the danger zone round the building should be adequately fenced off and sign posted. To protect the public a fence 2m high should be erected enclosing the demolition operations and the access gates should be secured outside working hours.
- vi) The fabric of buildings contaminated with substances hazardous to health should be decontaminated. Protective clothing and respiratory devices should be provided and worn.
- vii) Where plant has contained flammable materials, special precautions should be taken to avoid fire and explosion.
- viii) The plant to be demolished should be isolated from all other plant that may contain flammable materials. Any residual flammable material in the plant should be rendered safe by cleaning, purging or the application of an inert atmosphere as appropriate.
- ix) Care should be taken not to demolish any parts, which would destroy the stability of other parts.
- x) Demolition activities should not be continued under adverse climatic conditions such as high winds, which could cause the collapse of already weakened structures.
- xi) To prevent hazards parts of structures should be adequately shored, braced or otherwise supported.
- xii) Structures should not be left in a condition in which they could be brought down by wind pressure or vibration.
- xiii) Where a deliberate controlled collapse technique is to be used, expert engineering advice should be obtained, and:
 - (a) it should only be used where the whole structure is to come down because it relies on the removal of key structural members to effect a total collapse;
 - (b) it should only be used on sites that are fairly level and where there is enough surrounding space for all operatives and equipment to be withdrawn to a safe distance.
- xiv) When equipment such as power shovels and bulldozers are used for

demolition, due consideration should be given to the nature of the building or structure, its dimensions, as well as to the power of the equipment being used.

- xv) If a swinging weight is used for demolition, a safety zone having a width of at least one-and-a-half times the height of the building or structure should be maintained around the points of impact.

6.13.2. Demolition of structural steelwork

- i) All precautions should be taken to prevent danger from any sudden twist, spring or collapse of steelwork, ironwork or reinforced concrete when it is cut or released.
- ii) Steel construction should be demolished tier by tier.
- iii) Structural steel parts should be lowered and not dropped from a height.

6.14 RADIOGRAPHY

- 6.14.1 All radiography jobs shall be carried out as per BARC Safety Regulations
- 6.14.2 During field radiography, nearby area around the radiation source should be cordoned off.
- 6.14.3 If the field radiography is to be done at the same location repeatedly, it is advisable to provide either a wire fencing around or a temporary brick enclosure.
- 6.14.4 Special permission/permit should be taken for radiography from area-in-charge.
- 6.14.5 As far as possible, field radiography should be done only during night time when there is little or no occupancy there.
- 6.14.6 Radiation warning signals should be pasted all along the cordoned off area.
- 6.14.7 Entry into the restricted area by unauthorised persons should be strictly prohibited during exposure.
- 6.14.8 The radiation level alongwith the cordon should be monitored by a suitable and well-calibrated radiation survey meter.
- 6.14.9 All personnel working with radiography sources should wear appropriate protective equipment and film badges issued by BARC.
- 6.14.10 Protection facilities such as manipulator rod, remote handling tongs, lead pots, radiation hazard placards and means of cordon off shall be available at each site.
- 6.14.11 The radiography source shall never be touched or handled directly with hands.
- 6.14.12 The package containing radiography cameras and sources should never be carried by public transport like bus, train etc.
- 6.14.13 Radiography sources and cameras, when not in use, should be stored inside a source pit with lock and key arrangement as approved by BARC. The storage room should preferably be located in an isolated area of minimum occupancy and radiation level outside the storage room should not exceed 0.25 mR/hr as per BARC Regulations.
- 6.14.14 In case of an accident (due to loss or of damage to radiography source), action should be taken in line with BARC Safety Rules/Guidelines.

6.15 SAND/SHOT BLASTING/ SPRAY PAINTING

- 6.15.1 Sand blasting should be used only after approval from competent person.
- 6.15.2 Air Compressor used for sand/shot blasting/painting should have guard and positioned away from the work place.
- 6.15.3 Exhaust of the prime mover, if IC engine is used, should be directed away from the work place.
- 6.15.4 In case of motor driven compressor, the body of the motor as well as the compressor to be properly earthed.
- 6.15.5 The hoses used for compressed air should be of proper quality, and health of the same to be ensured through regular check/ test.

- 6.15.6 The operator of sand/shot blasting/painting should wear suitable PPE's including mask.
- 6.15.7 Adequate measures to be taken to suppress dust/spray particle.
- 6.15.8 Sand used for sand blasting should be suitably covered & protected from rain/moisture.
- 6.15.9 When these activities are done in confined places, adequate measure to be taken for proper ventilation.

6.16 WORK ABOVE WATER

6.16.1 General Provisions

- i) Where work is done over or in close proximity to water & where possibility of drowning exists, provision should be made for:
 - a) Preventing workers from falling into water;
 - b) The rescue of workers in danger of drowning;
 - c) Safe and sufficient transport.
- ii) Provisions for the safe performance of work over or in close proximity to water should include, where appropriate, the provision and use of suitable and adequate:
 - a) fencing, safety nets and safety harnesses;
 - b) lifebuoys, life jackets and manned boats;
 - c) protection against such hazards as reptiles and other animals.
- iii) Gangways, pontoons, bridges, footbridges and other walkways or work places over water should:
 - a) possess adequate strength and stability;
 - b) be sufficiently wide to allow safe movement of workers;
 - c) have level surfaces free from tripping hazards;
 - d) be adequately lit when natural light is insufficient;
 - e) where practicable and necessary, to prevent danger, be provided with toe-boards, guard rails, hand ropes etc.
 - f) be secured to prevent dislodgment by rising water or high winds;
 - g) if necessary, be equipped with ladders which should be sound, of sufficient strength and length and be securely lashed to prevent slipping.

- iv) All deck openings including those for buckets should be fenced.

6.16.2 Rescue & Emergency procedures

- i) Persons who work over water should be provided with some form of buoyancy aid. Life jackets should provide sufficient freedom of movement, have sufficient buoyancy to bring persons to the surface and keep them afloat face upwards, be easily secured to the body, be readily visible by way of self luminous paint/strip.
- ii) Nobody should work alone on or above water.
- iii) Each worker should be trained in the procedure to be followed in the event of an emergency.

7.0 ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS

In addition to general safety precautions as outlined above for the activities in Clause 6.0, following additional safety precautions need to be taken for the sites within the operating area or nearby, where presence of Hydrocarbons cannot be ruled out.

- i) No job shall be carried out without a valid permit. Permit should be in line with OISD-STD-105 "Work Permit System".
- ii) Smoking should be prohibited in all places containing readily combustible or flammable materials and "No Smoking" notices be prominently displayed.
- iii) In confined spaces and other places where flammable gases, vapours or dusts can cause danger, following measures should be taken:
 - (a) only approved type electrical installations and equipment, including portable lamps, should be used;
 - (b) there should be no naked flames or source of ignition;
 - (c) oily rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place;
 - (d) ventilation should be provided.

- iv) Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations.
- v) Welding, flame cutting and other hot work should only be done after issuance of work permit in line with the requirement of OISD-STD-105 after appropriate precautions, as required, are taken to reduce the risk of fire. For carrying out other jobs also, OISD-STD-105 should be followed strictly.
- vi) Fire-extinguishing equipment should be well maintained and inspected at suitable intervals by a competent person. Access to fire-extinguishing equipment such as hydrants, portable extinguishers and connections for hoses should be kept clear at all times.
- vii) All supervisors and a sufficient number of workers should be trained in the use of fire-extinguishing equipment, so that adequate trained personnel are readily available during all working periods.
- viii) Audio means to give warning in case of fire should be provided where this is necessary to prevent danger. Such warning should be clearly audible in all parts of the site where persons are liable to work. There should be an effective evacuation plan so that all persons are evacuated speedily without panic and accounted for and all plant and processes shut down.
- ix) Notices should be posted at conspicuous places indicating:
 - (a) the nearest fire alarm;
 - (b) the telephone number and address of the nearest emergency services.
- x) The work site shall be cleared of all combustible materials, as Sparks and molten metal coming from the welding job can easily ignite combustible materials near or below the welding site. If the combustible materials cannot be removed from the area, the same shall be properly shielded.
- xi) A dry chemical type fire extinguisher shall be made available in the work area. Also fire protection facilities like running hoses etc. as per permit should be complied with.
- xii) Wherever required, welding screens shall be put up to protect other equipment in adjoining areas against flying sparks. Material used should be metal/asbestos/water curtain.
- xiii) Welding or cutting of vessels/equipments used in Hydrocarbon/hazardous chemicals shall be done after proper gas freeing and verifying the same with the explosive-meter.
- xiv) The confined space/equipment shall be gas freed and cleaned.
- xv) Absence of any toxic gas and any flammable gas above explosion limit shall be ensured with the help of gas detection instrument and explosive meter respectively.
- xvi) Used and hot electrode stubs shall be discarded in a metal bucket.
- xvii) Use approved and certified flame arrestors for vehicles.
- xviii) Work permit to be obtained, if construction work is carried out within existing operating area.

8.0 FIRST AID

First aid facilities should be provided in line with various statutory regulations like factory act etc. However following care should be taken:

- i) First aid, including the provision of trained personnel should be ensured at work sites. Arrangement should be made for ensuring the medical attention of the injured workers. First aid box should be as per the Factory rules.
- ii) Suitable rescue equipment, like stretchers should be kept readily available at the construction site.
- iii) First-aid kits or boxes, as appropriate and as per statutory requirements, should be provided at workplaces and be protected against contamination by dust, moisture etc.

- iv) First-aid kit or boxes should not keep anything besides material for first aid in emergencies.
- v) First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render the first aid and be regularly inspected and stocked.
- vi) Where the work involves risk of drowning, asphyxiation or electric shock, first-aid personnel should be proficient in the use of resuscitation and other life saving techniques and in rescue procedures.
- vii) Emergency telephone numbers of nearby Hospitals, Police, Fire Station and Administration should be prominently displayed.

9.0 DOCUMENTATION

The intention of keeping documentation of all types of accident(s) is to prevent recurrence of similar accident(s). All accidents should be reported as per OISD Guidelines (OISD-GDN-107) and Factories act, 1948.

All accidents (major, minor or near miss) should be investigated, analysed and recommendations should be documented along with implementation status.

All related data should be well-documented and further analysis highlighting the major cause(s) of accidents be done. This will help in identifying thrust areas and training needs for prevention of accidents.

10.0 SAFETY AWARENESS & TRAINING

Safety awareness to all section of personnel ranging from site-in-charge to workmen helps not only preventing the risk but also build up the confidence. Time and expenditures also get saved as a result.

Safety awareness basically seeks to persuade/inform people on safety besides supplementing skill also. Awareness programme may include followings:

- i) **Poster:** Posters with safety slogan in humorous, gruesome demonstrating manner may be used to discourage bad habits attributable to accidents by appealing to the workers' pride, self-love, affection curiosity or human aspects. These should be displayed in prominent location(s).
- ii) **Safety Sign Boards:** Different type of message of cautioning, attention, notice etc. should be displayed at the appropriate places for learning/awareness of the workmen while working at site.
- iii) **Films & Slides:** Film(s) narrating the accident including the causes and possible remedial ways of preventing the recurrence of a similar accident should be displayed at regular intervals. Slides consisting main points of the film show may also be shown to workers.
- iv) **Talks, lectures & conferences:** The success of these events would depend much on audience's understandings of the speaker (s). The speakers are to be knowledgeable and good presenter. Speakers should know to hold the attention and to influence the audiences.
- v) **Competitions:** Organise competition(s) between the different deptts/categories of workers. The sense of reward/recognition also will improve safety awareness and result in enhancing safety levels.
- vi) **Exhibitions:** Exhibitions also make the workers acquainted with hazards and means of preventive measures.
- vii) **Safety Publication:** Safety publications including pocket books dealing with ways of investigation and prevention in the field of safety and so on, may be distributed to workers to promote the safety awareness.
- viii) **Safety Drives:** From time to time, an intensive safety drive by organising a safety day or a safety week etc. should be launched.
- ix) **Training:** Training for covering the hazards for different trade should be imparted. Training should also include the specific hazards related

to a job in addition to the general safety training as has been dealt in various chapters and should include all workers. Reference may be drawn from OISD-STD-154.

11.0 REFERENCES

- i) *Factory Act, 1948*
- ii) *Indian Electricity Rules*
- iii) *Safety & Health in Construction by ILO*
- iv) *The Building & Other Construction Workers (Regulation, Employment and Conditions of Service) Act 1996*

**LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF
INDIAN STANDARDS**

Sr.no	Code No.	Title
01. IS : 818		Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
02. IS : 875		Code of practice for Structural safety of buildings: Masonry walls
03. IS : 933		Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
04. IS : 1179		Specification for Equipment for Eye and Face Protection during Welding – First Revision.
05. IS : 1904		Code of practice for Structural safety of buildings: Shallow foundations
06. IS : 1905		Code of practice for Structural safety of buildings: Masonry walls
07. IS : 2171		Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision.
08. IS : 2361		Specification for Building Grips – First Revision.
09. IS : 2750		Specification for Steel Scaffoldings.
10. IS : 2925		Specification for Industrial Safety Helmets – First Revision.
11. IS : 3016		Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision.
12. IS : 3521		Industrial safety belts and harnesses
13. IS : 3696 – Part I		Safety Code for Scaffolds and Ladders : Part I – Scaffolds.
14. IS : 3696 – Part II		Safety Code for Scaffolds and Ladders : Part II – Ladders.
15. IS : 3764		Safety Code for Excavation Work.
16. IS : 4014 -Part I & II		Code of practice for Steel tubular scaffolding
17. IS : 4081		Safety Code for Blasting and Related Drilling Operations.
18. IS : 4082		Recommendations on staking and storage of construction materials at site
19. IS : 4130		Safety Code for Demolition of Buildings – First Revision.
20. IS : 4138		Safety Code Working in Compressed Air-First Revision
21. IS : 4756		Safety code for Tunneling works
22. IS : 4912		Safety requirements for Floor and Wall Openings, Railings and toe Boards –First Revision.
23. IS : 5121		Safety Code for Piling and other Deep Foundations.
24. IS : 5916		Safety Code for Construction involving use of Hot Bituminous Materials.
25. IS : 5983		Specification for Eye Protectors – First Revision.
26. IS : 6922		Structures subject to underground blasts, criteria for safety and design of
27. IS : 7155		Code of recommended practices for conveyor safety
28. IS : 7205		Safety Code for Erection on Structural Steel Works.

Sr.no	Code No.	Title
29.	IS : 7069	Safety Code for Handling and Storage of Building Materials.
30.	IS : 7293	Safety Code for Working with Construction Machinery.
31.	IS : 7323	Guidelines for operation of Reservoirs
32.	IS : 7969	Safety code for handling and storage of building material
33.	IS : 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals.
34.	IS : 8989	Safety Code for Erection of Concrete Framed Structures.
35.	IS : 9706	Code of Practices for construction of Arial ropeways for transportation of material
36.	IS : 9759	Guidelines for de-watering during construction
37.	IS : 9944	Recommendations on safe working load for natural and man-made fibre roap slings
38.	IS : 10291	Safety code for dress divers in civil engineering works
39.	IS :10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects.
40.	IS :10386 – Part II	Safety Code for Construction, Operation and Maintenance of River Valley Projects.
41.	IS : 11057	Code of practice for Industrial safety nets
42.	IS : 13415	Code of Practice on safety for Protective barriers in and around building
43.	IS : 13416	Recommendations for preventive measures against hazards at working places

OISD – GDN – 207

**FOR RESTRICTED
CIRCULATION ONLY**

OCTOBER 2002

CONTRACTOR SAFETY

OISD – GUIDELINES – 207

**Oil Industry Safety Directorate
Government of India
Ministry of Petroleum & Natural Gas**

CONTRACTOR SAFETY

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CONTRACTOR SAFETY

1.0 INTRODUCTION

Oil and Gas operations like Drilling, Production, Refining, Transportation and Distribution are inherently hazardous. A large number of contractor workforce is deployed to carry out construction, maintenance and other jobs. The analysis of the incidents in the Petroleum Sector indicates that a large number of incidents involved contractor workforce and have resulted in either casualty or injury besides leading to property damage and operational interruptions and environmental degradation.

In order to improve the safety levels of oil installations, the contractor safety is of utmost importance and there is a need to institute a good contractor safety system.

2.0 SCOPE

This standard covers broadly the guidelines on the management system for enhancing the safety levels of the contractor workforce deployed in construction, maintenance and operation activities in the hydrocarbon industry.

The safety precautions to be taken while carrying out different activities during construction / maintenance have separately been covered in OISD-GDN-192 on "Safety Practices during Construction".

3.0 DEFINITIONS

Work station/Work site

A place/unit where the job is carried out by contractor/executing agency in specified manner with safety, during construction phase or in operation phase.

Owner

Any physical or legal person/entity for whom prescribed job is carried out.

It shall also include owner's designated representative / consultant /nominee / agent, authorised from time to time to act for and

on its behalf, for supervising / co-ordinating the activities of the contractor/execution agency.

Contractor / Executing Agency

A physical or legal person/entity having contractual obligation with the owner, and who deploys one or more worker on the site.

Contractor Worker

It covers all workmen who are either self-employed or employed through contractor, the casual workers and includes contractor's supervisor, working at a location / site employed directly by Owner or through their contractor.

Incident

An incident is an unplanned, uncontrolled, unintended or unforeseen event, caused by unsafe acts and / or unsafe conditions, resulting in or having the potential to result in personal injury and/or property damage.

Consultant

Consultant is a physical or legal person/entity engaged by owner to provide the consultancy services to owner for management of the contract on their behalf or as specified.

Designer

Designer is a physical or legal person / entity engaged by owner to provide design services of a work site.

Owner's Representative / Engineer In Charge

The Owner's representative/Engineer-in-charge is the one, who has been designated by the owner to manage the contract.

Owner's Safety Officer

A properly trained person designated by owner who ensures safety at work site.

4.0 DUTIES/ RESPONSIBILITIES

4.1 OWNER

4.1.1 Owner's Management

The commitment to safety has to be emphasised by the owner by practice by its own management and employees at all levels. The duties and responsibilities of owner should include:

- i) To institute a mechanism for identification and compliance of all applicable statutory rules & regulations (Refer Annexure I for a list of few important Bureau of Indian Standards & statutory regulations).
- ii) To provide specific information to contractors and make workers aware on the hazards associated with job assigned.
- iii) To provide information about Risk Mitigation measures available at the place of work.
- iv) To provide the contractor with information on Owners Safety Plan & Regulations, Emergency Management Plan, lockout/ tag out procedure, confined space entry, work permit system, excavation/trench permit system etc.
- v) To specify rules (e.g. for security including access arrangements) and safety rules such as fire protection, first aid arrangements, Work Permit systems etc.
- vi) To provide comprehensive list of statutory regulations / standards and specification, to be complied with during execution of contract, in the tender document itself.
- vii) To ensure training of the contractor workforce, medical examination, and proper usage of safety equipment.

viii) To specify the requirements of Health, Safety and Environment (HSE) (commensurate with the nature of job) in Pre- Qualification criteria.

ix) To designate Engineer-in-charge and safety officer.

x) To arrange for a multi-disciplinary safety audit team to conduct surprise / regular safety audits and monitor the implementation of the recommendations.

xi) To introduce suitable schemes for motivation of the contractor worker to adhere to safety guidelines.

xii) To review safety practices & their implementation through periodic surprise visit of the work sites and monthly review meeting.

xiii) To develop the HSE plans and incorporate the same in the tender document.

xiv) To liaise with external agencies like press, public etc and with law enforcement, regulatory, statutory agencies etc.

xv) To report to statutory agencies on safety compliance and accidents, if any.

4.1.2 Owner's Representative/Engineer-in-charge

The duties & responsibilities of engineer-in-charge should include:

- i) To ensure that all Contract requirements including Health, Safety, Environment & Security are complied with.
- ii) To ensure that contractor workforce deployed is adequately qualified, trained and in state of health to commensurate with the requirements of the job.
- iii) To ensure that the Tools / Tackles and Machinery being used are properly

tested and are in sound working conditions and necessary resources proposed for providing safe place of work and necessary PPE are being used.

- iv) To take the required necessary corrective action immediately upon noticing or receipt of a report on noncompliance or any such condition which poses a threat to health, safety or environment. If during the course of execution of the contract, any situation of non-compliance with the contractor's safety and health plan are noticed / reported, the same will be taken up with the contractor for correction. In the event of repeated non compliance, suitable action to be initiated as per the contract.
- v) To ensure that the incidents are reported to all concerned within stipulated timeframe.
- vi) To ensure submission of a plan for safe working (Method Statement) from contractor and approval of the same by competent person / department.
- vii) To ensure that Work Permit System in line with OISD-STD-105 is adhered to.
- viii) To ensure availability of all the documentation needed for the execution of contract.
- ix) To ensure that the quality controls have been maintained during fabrication/erection and all jobs required for safe commissioning have been carried out.
- x) To ensure safe dismantling of all temporary facilities/connections put up by the contractor, after completion of work.
- xi) To compile a report on the safety performance (at the conclusion of each contract or periodically such as annually for renewable and long-term

contracts), which is to be considered in future when selecting contractors.

- xii) To ensure that the Consultant, contractor and sub-contractor employ / designate qualified & trained Safety Engineer / Officer commensurate with requirement of the job.

4.1.3 Owner's Safety Officer

The duties & responsibilities of the Owner's Safety Officer should include:

- i) To assess the hazards associated with jobs in consultation with all concerned and establish safe working procedure including identification of the escape routes.
- ii) To establish a written record of factors which can cause injuries and illnesses.
- iii) To undertake routine/surprise inspections of all work sites and identify unsafe conditions & practices, if any. Check for compliance of the safety practices being followed with approved HSE Plan.
- iv) To investigate promptly the incidents (including near-miss) in order to advise corrective and/or preventive action.
- v) To maintain statistical information for use in analyzing all phases of incidents and events involving contract personnel.
- vi) To provide the means for complying with the reporting requirements for occupational injuries and illnesses.
- vii) To check whether the proposed working arrangements are safe and satisfactory, particularly at the interface between the contractor's planned work and owner's existing facilities.
- viii) To communicate to the Contractor the imposed restrictions which may affect the work/personnel such as the temporary closure of a corridor or electrical isolation of equipment.

- ix) To review and monitor the contractor's adherence to approved HSE plan and all applicable environmental, health, and safety requirements.
- x) To ensure that Consultant, Contractor's Managers, Supervisors and workmen at all levels (who will plan, monitor, oversee and carry out the work) undergo Health, Safety and Environmental training in their respective responsibilities with respect to conducting work safely and with due regard for the protection of the environment.
- xi) To identify areas of operations where specialized training is required to deal with potential dangers.
- xii) To document and to bring to the attention of the Owner's Supervisor and Contractor any non-compliance/violation of the safety norms against approved safety and health plan or safety and health requirements and also raise these issues in the Safety Committee Meetings.
- xiii) To take part in Tool Box Meetings at random and to ensure maintenance of records.

4.2 CONTRACTOR

4.2.1 Contractor's Management

Duties & responsibilities of the contractor should include the following:

- i) To implement safe methods and practices, deploy appropriate machinery, tools & tackles, experienced supervisory personnel and skilled work force etc. required for execution.
- ii) To prepare a comprehensive and documented plan for implementation, monitoring and reporting of Health, Safety and Environment (HSE) and implement the same after its approval.

- iii) To nominate qualified & trained Safety Engineers / Officers reporting to the Site in charge, for supervision, co-ordination and, liaison for the implementation of the safety plan.

Similar HSE Plan should be implemented at the sub- contractor's or supplier's site /office. However the compliance with the HSE Plan is to be the sole responsibility of the Contractor.

- iv) To arrange suitable facilities in liaison with the owner for drinking water, toilets, lighting, canteen, crèche etc as applicable as per Laws/ Legislation at site and also arrange for workmen compensation insurance, third party liability insurance, registration under ESI / PF act etc as applicable.
- v) To arrange for fire protection equipment as per the advice of owner.
- vi) To ensure that its employees have completed appropriate health and safety training as required by the statute / regulation and also as per requirements of the Owner / Consultant. The documentation of such training imparted to all its employees should be maintained and produced for verification as required.
- vii) To comply with all the security arrangements of owner.
- viii) To ensure that the plant and equipment used on-site by him / his employees is correctly registered, controlled and maintained in sound working condition.
- ix) To ensure availability of First Aid boxes and First Aid trained attendant.
- x) To ensure that all incidents including near misses are reported to all concerned immediately.

In construction projects where sub-contractors are engaged, the contractor should set out the responsibilities, duties and safety measures that are expected of

the sub-contractor's workforce. These measures should include the provision and use of specific safety equipment, methods of carrying out specific tasks on safety and the inspection and appropriate use of tools.

The responsibilities indicated separately under contractor's Supervisor, Safety Officer and contract worker are contractually that of the Contractor and legally binding on the Contractor only. However the specific detailing as above has been given separately for guidance and operational convenience.

The selection of sub contractors, if employed, should be approved by the owner. Sub-contractor should comply fully with all safety rules and conditions applicable to the main contractor.

4.2.2 Contractor's Supervisor / Safety Officer

Duties & responsibilities of the Contractor's supervisor/Safety Officer should include the following:

- i) To ensure strict compliance with work permit system by carrying out work only with appropriate work permits and after ensuring that all safety precautions / conditions in the permit are complied with and closing the same after job completion.
- ii) To ensure that required guards and protective equipment are provided, used, and properly maintained.
- iii) To ensure that tools and equipment are properly maintained and tested.
- iv) To plan the workload and assign workers to jobs in commensuration with their qualification, experience and state of health.
- v) To ensure that the workers understand the work to be done, the hazards that may be encountered, and the proper precautions/procedure for carrying out the work safely.
- vi) To take immediate action to correct any violation of safety rules observed or reported.
- vii) To ensure that the workers likely to be exposed to hazardous chemicals/materials have access to appropriate Material Safety Data Sheets (MSDS), wherever applicable, and provide necessary mitigation measures.
- viii) To ensure inspection and certification of all tools (hand operated as well as mechanically operated) being used. Defective tools shall be immediately removed.
- ix) To ensure that appropriate warning signboards or tags are displayed.
- x) To ensure that workers have proper training for their job assignments, including use of appropriate PPE and first aid fire fighting equipment.
- xi) To comply with all applicable safety and health standards, rules, regulations and orders issued by competent authority pertaining to the assigned activities.
- xii) To ensure that sick and/or injured workers receive appropriate first aid and/or medical attention.
- xiii) To report each incident and/or injury in accordance with established procedures and assist in investigation.
- xiv) To take necessary action for correction of any unsafe act / condition at the workplace. However, in case the same is outside the limits of authority, it should be reported to Owner's Engineer-in-charge immediately.
- xv) To conduct daily inspections to ensure compliance with safety standards, codes, regulations, rules and orders applicable to the work concerned.

- xvi) To ensure that workers under their supervision are aware of their responsibilities.
- xvii) To arrange daily tool box meeting and regular site safety meetings and maintain records in the required formats. (Refer Clause 5.9.1)
- xviii) To arrange stand-by supervisor/ worker where situations so demand.
- xix) To develop methods and display banners/posters to inculcate safety consciousness.
- xx) To attend training and ensure participation of his workers for training as per schedule arranged by the Owner / Consultant and keeps himself updated.
- xxi) To keep records of number of persons working at the site.
- xxii) To keep a constant liaison with Engg-in-charge / owners' representative on safety issues.
- xxiii) To maintain accident & nearmiss record in a register.
- xxiv) To ensure that only PPE of the approved type by owner is used at site.

A separate Safety Officer should be assigned, where more than 100 workers are employed at site. For smaller jobs, the supervisor should assume the role of the safety officer also.

4.2.3 Contract workers

The duties & responsibilities of the contractor worker should include the following:

- i) To perform work safely as per the job requirement and instructions.
- ii) To inform all concerned regarding unsafe conditions/acts.

- iii) To wear PPE as stipulated and necessary for the job.
- iv) To inform promptly to their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage.
- v) To take all necessary and appropriate safety precautions to protect themselves, other personnel and the environment.

4.3 CONSULTANT

The activities and responsibilities covered under the scope of the Owner may be delegated to the consultant in those cases as applicable, based on the respective contract conditions. The primary responsibility of Consultant is to ensure compliance with agreed HSE plan for the contract by the Contractor. However those responsibilities conferred on Owner as Principal employer cannot be delegated to consultant.

Where the consultant's scope involves Engineering and Design, those factors under **Designer** should also be applicable.

In all cases, the Consultant's scope should include submission of latest HSE plans for work under his and Contractor's purview and implementing the same till job completion. It should conform to owner's overall HSE plan. This should include Guidelines and Implementation and Reporting Methodology to be followed with required report formats.

Adequate number of Safety Officers shall be provided by the Consultant with necessary skills required for the work to be performed.

The Consultant shall review the documents submitted by the contractor and advise owner on acceptance as well as advise suitability and number of Contractor's safety officers / supervisors.

4.4 DESIGNER

The Process Designer should identify all hazards and risks likely to be encountered during fabrication, erection including

dismantling, Pre-commissioning, commissioning and Performance run to meet the Guarantees and advise the risk mitigation measures.

All the hazards and safety measures to be adopted while handling Dangerous chemicals and Catalysts should be detailed by the Process Licensor and the same should be again included in the scope of the suppliers. Specific write ups/MSDS should be obtained from Patented single source suppliers also.

Designs should recognize, include and apply safe practice during preparation, construction and subsequent operational use and maintenance after completion of the Project.

All documents including drawings and calculations are to be originated, checked and approved in accordance with latest international codes, standards, specifications and design basis philosophy.

Preferred use of low risk materials, policy on hazardous substances, preferred use of low noise and dust-suppressed equipment etc. should be encouraged.

5.0 SAFETY MANAGEMENT

5.1 JOB SAFETY ANALYSIS (JSA)

Job safety analysis (JSA) provides a mechanism by which the contractor, safety officer or supervisor take a detailed look at how an individual task is performed and its inherent hazards and preventive measures. This procedure helps in integrating accepted safety and health principles and practices into a particular operation. In a JSA, each step of the job is examined to identify potential hazards and to determine the safest way to do the job.

A job safety analysis includes five steps as below:

- Select a job
- Break the job down into a sequence of steps
- Identify the hazards against each of these steps (based on knowledge of

accident, causes of injuries and personal experience) and determine the preventive measures to overcome these hazards

- Apply the controls to the hazards
- Evaluate the controls

5.2 CRITERIA OF SELECTION OF A CONTRACTOR

“Contractor Safety” can be ensured to a large extent if competent agency for execution of assignment or job, based on HSE system agreed upon by owner, is selected. It is necessary to assess his capabilities and competencies to perform work safely.

A databank should be developed for all the contractors for their past performance on HSE aspects. An attempt should also be made to get similar data from other similar industries.

The data required will depend upon complexity involved in the job and type / size of resources required. Format needs to be suitably developed depending upon size, nature of the job & hazard associated therein. The format designed should also take care of the skill required to carry out the job.

Performance review is essential for all type of contractors. It helps in recording actual performance/experience with contractors while the contract is in progress. It is essential that resources agreed as per the contract are reviewed at mobilization stage for ensuring compliance from the day one and thorough effective supervision / monitoring system are at place.

This activity also helps in taking timely action in case of unsatisfactory performance to correct the situation and ensure safe work during execution period and deciding about suitability of the contractor for future jobs.

The periodicity of such performance review will depend upon size/type/complexity of contract. However, the performance should be reviewed at least at mobilisation stage and at the end of the contract.

5.3 SITE PLANNING AND LAYOUT

Before starting the construction/maintenance job at existing workplace in operation or green field locations, following should be ensured: -

- i) Details regarding location of workshop/ fabrication yard, site office, stores, laboratory, electrical installations, placement of construction machinery, medical and welfare facilities, lighting underground and above ground piping route, cable route etc. should be decided prior to commencement of the work in consultation with owner / Consultants and implementation should be ensured. Layout should be displayed at strategic locations.
- ii) The resources required to meet any emergency situations like fire fighting, first aid etc. should be planned and mobilized as per the job requirement.
- iii) The sequence or order in which work to be done and any hazardous operations or processes should be identified.
- iv) Free access to site shall be provided with clear roads, passage, gangways, staircases etc. Access to construction site should be leveled, open and free from any obstructions like construction material or scrap/waste, exposure to hazards such as falling materials, material handling equipment and vehicles. Any pit or ditch shall be covered or barricaded.
- v) Arrangements should be made to maintain good housekeeping at site. Scrap and debris generated out of construction work should be removed/disposed off at a regular interval as directed. Emergency exit should be provided in case of blockade of primary exit.
- vi) Suitable warning notices and also the routes to and from welfare facilities should be displayed prominently.

vii) Pedestrian pathways and routes for vehicular traffic (light/heavy vehicles including material handling equipment) should be earmarked.

viii) Artificial lighting to be provided at places where work continues or workers pass by after sunset or in case natural light is insufficient like confined spaces.

ix) Keep all equipment /machines under cover to prevent them from dust, rain/flood water, heat etc. and follow storage instructions as applicable for each of them.

5.4 GATE ENTRY PROCEDURE

Gate entry at any site / workplace / unit is to be restricted to ensure entry of only authorised persons / vehicles.

5.4.1 Entry procedure for all contractor worker should be as follows:

A. Issuance of Pass

- i) The passes are to be issued after the owner's representative/engineer-in-charge forwards the application of the contractor providing complete details of the workers being engaged. The contractor may be asked to submit Character & Antecedents (C&A) verification of individual worker from concerned authorities.
- ii) With regard to issuance of passes for all vehicles including material handling equipment, owner's representative / engineer-in-charge should forward the application only after ensuring that all documents pertaining to the fitness of the vehicle/equipment and valid driving license of the driver etc. are available.
- iii) The passes should be serially numbered with address, contractor name, identification mark, signature of the worker etc.
- iv) Special colour code for passes should be used for persons entering different

areas like Administrative Block, Unit area, Project Area (wherever applicable).

- v) Contractor workers engaged on routine basis for long periods should be provided with monthly photo pass.
- vi) Special permit is required separately for working beyond normal working hours and holidays.

B. Gate Entry

- i) Entry of the contractor's employees should be permitted with valid gate passes only.
- ii) Entry of contractor's workers should be allowed in presence of authorized representative of contractor.
- iii) Records of persons at the time of entry/exit should be maintained.
- iv) At the entry gate of the location, a physical checking for non-carrying of lighter, matchboxes, explosives etc. should be carried out.
- v) Gate passes/Identity Cards should be displayed on persons at all the times.
- vi) For Mega-projects at existing / operating installations, it is preferable to have a separate gate for entry of contractor workers and also the project areas should be segregated fencing from operational area by fencing / other physical means.
- vii) No vehicle should be allowed to enter in an operational area without proper flame arrestor.
- viii) Awareness on Safety through training / posters etc. highlighting Do's and Don'ts should be spread within entire contractor workforce. Video/Audio tapes on Safety Topics should be played preferably.
- ix) For occasionally engaged labourers such as for material handling etc., spot photograph may be preferably

taken with two copies (one for preparing the pass and other for attachment with gate register). Specific advice and recommendation of User Department may be given due cognizance. Relevant details are to be written. The pass should be collected back at the gate after day's work.

5.4.2 Tank Truck Loading (TTL) Operation :

At the loading / unloading location, a large no. of Tank Trucks of petroleum products enter the installation. Crew members are generally not regular entrants. The procedure should be as follows:

- i) The gate pass should be issued to the individual crew members on written request of the transporter mentioning TT registration nos., License and certificate of training as per MV rule 9.
- ii) Character & Antecedent (C & A) verification of the TTL crew through local police is to be done preferably and record maintained.
- iii) For loading/unloading purpose, register entry at security gate is made before allowing entry into the premises with recording of names of crew members, time of entry, pass Sr. No., TT no. etc.
- iv) For loading/unloading, crew is allowed entry alongwith TT only, after checking of TT from explosive/security point of view.
- v) Out time, invoice no., Destination etc., are recorded while TTs go out of the security gate.

5.5 TRAINING

Training is to educate contractor workforce on various hazards associated with the job/workplace and on the respective preventive / mitigation measures to avoid untoward incidents.

i) Workers should be adequately and suitably:

- (a) informed of potential safety and health hazards to which they may be exposed to at their workplace;
- (b) instructed and trained in the measures available for the prevention, control and protection against those hazards.

ii) No person should be employed in any work at a workplace unless that person has received the necessary information, instruction and training so as to be able to do the work competently and safely. The competent authority should, in collaboration with employers, promote training programs to enable all the workers to read and understand the information / instructions related to safety and health matters.

iii) The information, instruction and training should be given in a language understood by the worker and written, Oral, visual and participative approaches should be used to ensure that the worker has assimilated the information.

iv) Every worker should receive instruction and training regarding the general safety and health measures common to the workplace. This should include:

- (a) general rights and duties of workers at the workplace;
- (b) means of access and egress both during normal working and in an emergency;
- (c) measures for good housekeeping;
- (d) location and proper use of welfare amenities and first aid facilities provided;
- (e) proper use and care of the items of personnel protective

equipment and protective clothing provided to the worker;

- (f) general measures for personal hygiene and health protection;
- (g) fire precautions to be taken;
- (h) action to be taken in case of an emergency;
- (i) requirements of relevant safety and health rules and regulations.

Copies of the relevant safety and health rules, regulations and procedures should be available to workers upon the commencement of and upon any change of employment.

5.5.1 Training Techniques

a) Lectures

This technique should be applied when it is required to transfer information in local language to a large contractor workforce with controlled content and time.

b) Case Study

This is an effective technique based on the presentation of case of real events by Trainer to highlight probable causes like Human Error, ignorance about the job etc.

c) Videos

Videos, an effective technique of communication, should be used to display the right techniques of performing a task in a safe manner and hazards associated with a job.

d) Demonstration at site

Right way to do a job should invariably be demonstrated to workers at the site itself. The right way is also a safe way. Hazards due to wrong procedures, short cuts and their adverse effects etc. should also be highlighted.

5.5.2 Training/Awareness Module and Frequency

A. General Safety Training to all categories of contractor employees should be imparted before induction and annually thereafter. No person should be allowed to enter the installation without undergoing this training. This training program may cover:

- i) Mandatory uses of PPE like Cotton clothes, Helmet, Safety Shoes, Safety Belts etc.
- ii) Probable Hazards
- iii) Important Telephone No / Escape route
- iv) First Aid
- v) Use of Fire extinguisher

The contractor workers, if engaged in operation of the plants/facilities, should be trained in line with Clause No. 4.6 of OISD-GDN-206 on "Safety Management System". For other categories of contractor workers, training modules for different category employees are as follows:

B. Contractor Supervisor

Contractor Supervisor should be trained in accordance with the provision of clause no. 5.1.1.2, 5.2.7, 5.3.10, 5.6.12 and 5.7.8 of OISD-STD-154 on 'Safety Aspects in Functional Training'

C. Contractor Worker

Yearly training programme should be carried out for contractor worker and the records should be maintained. The training programme should cover at least the following:

- i) Worker responsibility for safety of himself and work area.
- ii) Associated hazards with the job and job area including electrical shock hazards.

- iii) Importance of First Aid fire fighting equipment, their use & operations
- iv) Communication system at the installation
- v) Fire / Accident Reporting procedure
- vi) General Safety rules
- vii) Safety Measures during execution of job such as:
 - Welding / Cutting / Grinding
 - Working at height
 - Confined space entry
 - X ray / radiation
 - Erection / Dismantling of scaffolding
 - Tank construction and repairs
 - Handling of chemicals etc.
- viii) Importance & use of PPE
- ix) Emergency Routes
- x) Assembly Points
- xi) Job Specific Training

D. Consultant / Contractor

Awareness program should be carried out for Consultant / Contractor at the time of induction. This program should cover at least the following:

- i) Responsibility of contractor for safety of their personnel and work area
- ii) Hazardous property of Petroleum products and chemical used
- iii) Communication system
- iv) Fire / Accident Reporting procedure
- v) Medical facility available
- vi) Statutory requirements

- vii) Importance of First Aid equipment and required at the site
- viii) Work Permit system
- ix) Direct/ Indirect losses due to accident
- x) Safety Measures while executing the jobs such as:
 - Welding / Cutting / Grinding
 - Working at height
 - Confined space entry
 - X ray / radiation
 - Erection / Dismantling of scaffolding
 - Tank construction and repairs
 - Handling of chemicals etc.
 - electrical jobs
- xi) Safety training needs of their supervisors and workers
- xii) Importance & Use of PPE at the site
- xiii) General Safety rules at the installation

E Security Personnel

Training program should be carried out for Security personnel at the time of induction and annually thereafter and the records should be maintained. The training program should cover at least the following:

- i) Layout of Plant and Facilities
- ii) Vulnerable locations
- iii) Safety regulations (Statutory and in company)
- iv) Fire Protection Facilities and Locations
- v) Role in case of Fire / Disaster
- vi) Emergency Procedure and Drills
- vii) Industrial First Aid
- viii) Use of Personnel Protective Equipment
- ix) Disaster Management Plan

5.6 INSPECTION / AUDIT

Inspection / Audit is a tool to evaluate compliance of all safety requirements. Most of the information could be gathered

through site inspection using ready-made check lists to ensure that contractors / agencies abide by the safety rules and norms while working at operating / construction sites.

A checklist, while carrying out different type of jobs, should be developed based on hazards associated with the job being performed and requirements as per OISD-GDN-192 on "Safety Practices during Construction". Typical format is enclosed at Annexure II, which should be modified to suit the requirement of the site / job to be done.

Before starting the work and at regular intervals thereafter, Contractor's Supervisor/safety Officer and Owner's representative / Engineer-in charge/safety Officer should inspect as per the checklist so prepared to ensure that contractor has prepared to start the work with all safety precaution required for safe execution of job.

5.7 PENALTIES FOR NON-COMPLIANCE

Financial or other type of penalties like seizure of gate passes, stoppage of work for a limited period etc. may be levied on the contractors or their workers for non-compliance of safety rules. A provision of suitable accident severity based penalty clause for contractor may be incorporated to ensure adherence of systems and procedures. A few of the usual non-compliance are as follows:

- Non-usage of PPEs like Safety helmet / Safety shoes / Safety goggles / Respiratory protection etc. by the contractor personnel
- Non-usage of the safety belt and life line by the workers while working at height
- Non-provision of basic safety requirement such as 24 V lamp for working in confined space, uncertified / non standard lifting tools, earth leakage protection & earthing connections for electrical appliances as per Indian Electricity Rules, emergency isolation switches etc.

- Violation of Safety Permit conditions like Fire fighting equipment
- Non-barricading of area while rigging, digging etc.
- Working without valid work permit
- Unauthorised road closure/blockage

5.8 INCIDENT REPORTING AND INVESTIGATION SYSTEM

All the incidents including near-miss should be reported immediately by contractor's Supervisor to Contractor and owner's Supervisor/Engineer-in-charge, who should inform to Owner's Safety Officer and owner's Management. Owner's Safety Department will be required for onward reporting as per OISD, Statutory requirements.

All accidents regardless of the extent of injury or damage should be investigated in order to find probable causes, lessons learnt thereof and remedial measures required to prevent its recurrence.

The incident investigation should be done as per provision of clause no. 4.12 of OISD-GDN-206 on 'Safety Management System'. All the recommendations of investigation / Enquiry Report need to be monitored closely for its implementation. A proper record needs to be maintained to ensure implementation of all the recommendations and same should be reviewed from time to time.

5.9 SAFETY COMMITTEE MEETINGS

Following three type of safety committee meetings should be held aiming at raising the level of safety consciousness at the site:

5.9.1 Toolbox meeting

To maintain awareness, update training and convey important safety and health information, contractor supervisors should conduct tool box meetings at least weekly and also prior to start of any work. All the contractor workers should attend this meeting. The owner's supervisor/Engineer-in-charge and safety officers should also

attend these meetings on random basis. Tool box meeting should be conducted more frequently depending upon circumstances. Record of the same can be maintained in the following typical format.

TOOLBOX MEETING FORM

SUBJECT :
 PRESENTER :
 DATE :
 TIME : From..... To.....
 CONTENT IN BRIEF :

Participant's Name	Signature
-----	-----
-----	-----
-----	-----

5.9.2 Site Safety Committee Meeting

Primary purpose of this safety committee is to enable owner, contractor and workers to work together to monitor the site safety and health plan so as to prevent accidents and improve working condition on site. Its size and membership will depend on the size and nature of job.

The safety committee should include representatives of owner, consultant, contractor identified as safety officer/supervisor. It should be headed by Engineer-in-charge.

The safety committee should have regular and frequent meetings, atleast fortnightly, to discuss the safety and health program on site and to make suggestions for improvement. The meetings should be documented with a time bound action plan. The functions carried out by safety committee should include:

- i) Review compliance of pending items of last Safety meetings.
- ii) Consideration of the reports of safety personnel.
- iii) Discussion of accident/near-miss and illness reports in order to make appropriate recommendation for prevention.

- | | |
|---|--|
| <ul style="list-style-type: none"> iv) Examination/evaluation of suggestions made by workers. v) Dissemination of acquired knowledge through training programs and information sharing sessions. vi) Discussion & review of Fire Prevention & Disaster Management Plan. vii) To send recommendation to Apex Body for consideration/approvals. | <ul style="list-style-type: none"> 2) OISD-GDN-192 on “Safety During Construction” 3) OISD-STD-155 Part(I&II) on “Personnel Protective Equipment” 4) Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996 |
|---|--|

5.9.3 Safety Review Meeting by Location Head

This meeting should be headed by the Location head and attended by Owner's Supervisor/Engineer-in-charge, owner's safety Officer and all concerned department heads. Prime purpose of this review is to ensure that all the recommendations of various committees are being complied with and to take decisions on critical points raised. This meeting should take place at least once in every quarter. All the investigation reports/ audit findings with status of implementation of recommendations should be discussed.

5.10 SAFETY EQUIPMENT / PERSONNEL PROTECTIVE EQUIPMENT

The type of safety equipment to be used is decided based on the job requirement. Selection should be made based on OISD-GDN-192, OISD-STD-155 (Part I & II) and the job requirement. Safety equipment / Personnel Protective Equipment (PPE) shall be of approved make. Contractor shall provide necessary training to each employee regarding proper usage and upkeep of PPE including its limitation.

A register showing stock and issue of PPE should be maintained by the contractor at site and must be available for inspection.

6.0 REFERENCES

- 1) OISD-GDN-206 on “Safety Management System”

ANNEXURE I**LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF
INDIAN STANDARDS**

Sl.no.	Code No.	Title
1	IS: 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
2	IS: 875	Code of practice for Structural safety of buildings: Masonry walls
3	IS: 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
4	IS: 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision
5	IS: 1904	Code of practice for Structural safety of buildings: Shallow foundations
6	IS: 1905	Code of practice for Structural safety of buildings: Masonry walls
7	IS: 1989 – Part II	Leather Safety Boots and shoes for heavy metal industry
8	IS: 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision
9	IS: 2361	Specification of Building Grips – First Revision
10	IS: 2750	Specification for Steel Scaffoldings
11	IS: 2925	Specification for Industrial Safety Helmets – First Revision
12	IS: 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision
13	IS: 3521	Industrial Safety Belts and harnesses
14	IS: 3696 – Part I	Safety Code for Scaffolds and Ladders: Part I – Scaffolds
15	IS: 3696 – Part II	Safety Code for Scaffolds and Ladders: Part II – Ladders
16	IS: 3764	Safety Code for Excavation Work
17	IS: 4014 – Part I & II	Code of Practice for Steel Tubular Scaffolding
18	IS: 4081	Safety Code for Blasting and Related Drilling Operations
19	IS: 4082	Recommendations on stacking and storage of construction materials at site
20	IS: 4130	Safety Code for Demolition of Buildings – First Revision
21	IS: 4138	Safety Code for working in compressed air – First Revision

22	IS: 4756	Safety Code for Tunneling works
23	IS: 4912	Safety requirements for Floor and Wall openings, Railings and toe boards – First Revision
24	IS: 5216 – Part I & II	Recommendations on safety procedures and practices in electrical work
25	IS: 5121	Safety code for piling and other deep foundations
26	IS: 5916	Safety Code for Construction involving use of Hot Bituminous materials
27	IS: 6994 – Part I	Specifications for safety gloves: Part I – Leather and Cotton gloves
28	IS: 5983	Specification for Eye Protectors – First Revision
29	IS: 6922	Criteria for safety and design of structures subject to underground blasts
30	IS: 7155	Code of recommended practices for conveyor safety
31	IS: 7205	Safety Code for Erection on Structural Steel Works
32	IS: 7069	Safety Code for Handling and Storage of Building Materials
33	IS: 7293	Safety Code for Working with Construction Machinery
34	IS: 7323	Guidelines for operation of Reservoirs
35	IS: 7969	Safety Code for handling and storage of building materials
36	IS: 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals
37	IS: 8989	Safety Code for Erection of Concrete Framed Structures
38	IS: 9706	Code of Practices for construction of Aerial ropeways for transportation of material
39	IS: 9759	Guidelines for de-watering during construction
40	IS: 9944	Recommendations on safe working load for natural and manmade fibre rope slings
41	IS: 10667	Guide for selection of industrial safety equipment for protection foot and leg
42	IS: 10291	Safety Code for dress divers in civil engineering works
43	IS: 10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects
44	IS: 10386 – Part II	Safety Code for Construction, Operation and Maintenance for

River Valley Projects

45	IS: 11057	Code of Practice for Industrial Safety Nets
46	IS: 13415	Code of Practice on safety for Protective barriers in and around building
47	IS: 13416	Recommendations for preventive measures against hazards at working places

Statutory Regulations

Latest Statutory Acts and Rules, as given below, may be referred:-

1. The Petroleum Acts 1934 and Petroleum Rules 2002
2. The Factory Act, 1948 (As amended by Factory Amendment Act 1987) and concerned Factory Rules
3. The Water (Prevention and Control of Pollution) Act 1974 & Rules 1975
4. The Environment (Protection) Act 1986
5. The Manufacturing, Storage and Import of Hazardous Rules 1989
6. The Hazardous Wastes Management (Management & Handling) Rules 1989
7. The Indian Electricity Act 1901 and Rules 1956
8. The Indian Explosive Acts, 1884 & The Indian Explosive Rules 1983
9. The Gas Cylinder Rules 1981 and the static & Mobile Pressure Vessels (Unfired) Rules 1981
10. The Indian Boiler Act 1923 and Regulations 1950
11. The Public Liability Act 1991 as amended in 1992
12. The Motor Vehicle act 1988 and Central Motor Vehicle rules 1989
13. Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996

In addition to above, various other statutory acts like EPF, ESIS, Minimum wage act and other local statutory requirements shall also be complied with.

CHECK LIST FOR SAFETY INSPECTION / AUDIT

Job _____ Location _____ Date of Audit _____ Frequency _____

Inspected by _____ Contractor (s) _____

Sl.no.	ITEM	YES	NO	NA	REMARKS / ACTION
1.0	PERSONNEL PROTECTIVE EQUIPMENT (PPE): Are following PPEs being used as per the job requirements?				
1.1	Safety Helmets				
1.2	Safety Shoes				
1.3	Gum Boots				
1.4	Safety Belts with life line				
1.5	Gloves				
1.6	Ear Plug				
1.7	Goggles				
1.8	Shield Glass				
1.9	Face Protection				
1.10	Breathing Apparatus				
1.11	Canister Mask				
1.12	Hand wash / Eye wash/ Respirating filter / cloth				
1.13	Boiler Suit				
1.14	Others				
2.0	HOUSE KEEPING				
2.1	Whether Waste Bins are provided / used				
2.2	Are Passageways / Walkways clear?				
2.3	Is General neatness O.K.?				
2.4	Is the Ground free from oil, grease etc. and is not found to be slippery?				
2.5	Others				

3.0	EXCAVATION				
3.1	Whether soil stability is checked?				
3.2	Whether proper shoring for the excavation is provided to prevent cave-in for side of slope >45 Degree?				
3.3	Whether proper precautions have been taken if the excavation is adjoining to heavy structure like building, street and roadways?				
3.4	While excavating whether proper slope usually 45° & suitable benches of 0.5 m width at each 1.5 m depth are provided?				
3.5	Whether barricading of 1m height with glowing caution board is provided for excavation beyond 1.5m depth?				
3.6	Whether excavating earth is placed beyond 1m of the edge of the trench?				
3.7	Whether heavy vehicle movement is restricted to come too close to the excavating area?				
3.8	Whether necessary precaution is taken for underground pipes, sewers, cables by contractors?				
3.9	Whether excavation hot work permit is taken?				
3.10	Whether extra precaution is taken for bailing out water properly while excavating?				
3.11	During rains whether the excavation is done with extra precaution to prevent caving in?				
3.12	Whether two separate entry/ exit points with necessary ladders / steps, as per requirement, have been provided?				
3.13	Whether one person is available at all the time to communicate any hazards noticed with workers working in deep trenches or excavation?				
3.14	Whether necessary precautions like				

	regular gas testing are being taken in areas having hydrocarbons and LPG so that no gas accumulation takes place in the trenches.				
3.15	Whether IS: 4081-1986 & Indian Explosive act & rules for storage, handling & carrying of explosive material and execution of blasting operation is followed?				
3.16	Whether in case of mechanised excavation, caution board is provided for do's and don'ts like 'Nobody to enter' within one meter of the extreme reach?				
3.17	Whether the following are inspected during excavation work :- a) Boulder formation encountered b) Collapsing / development of cracks of sides c) Marked damage to support d) Unexpected fall of ground e) Inspection of site after each blast.				
3.18	Others				
4.0	PERMITS				
4.1	Whether valid work permit is issued to start any work?				
4.2	Whether all conditions of the permit are fulfilled before starting the job?				
4.3	As noted in the permit, whether compliance of all the recommendations are ensured?				
4.4	Whether permits are available at work site all the times?				
4.5	Whether hot work permit registered in fire station?				
4.6	Whether permits are being closed after the completion of job?				
4.7	Others				
5.0	SAFETY IN CUTTING / WELDING/GRINDING				
5.1	Whether LPG / Oxygen / Acetylene/ Gas				

	cylinders are kept outside only while working in confined space?				
5.2	Are Acetylene /LPG cylinders kept in upright position and secured at designated places under shed – wet gunny bags wrapped around it if the same is under sun at designated place?				
5.3	Check cylinder and cylinder valves for any kind of damage?				
5.4	Whether protective valves are kept on cylinder while not in use?				
5.5	Whether proper means and method for transportation of cylinders to avoid dropping and rolling are being adopted / followed?				
5.6	Whether gas cylinders, regulators are kept away/free from oil and grease?				
5.7	Whether all hoses were found to be free of any damage or crack?				
5.8	Whether oxygen and acetylene cylinders are stored separately?				
5.9	Whether color coding is being used for easy identification of different type of cylinders and hoses?				
5.10	Whether cylinder keys are available near the cylinder?				
5.11	Whether gas torches with NRV with flash back arrestor of approved make are only being used?				
5.12	Whether pressure gauges are in working condition and checked from time to time?				
5.13	Whether welding shields are used while welding?				
5.14	Whether proper earthing for welding machines are provided?				
5.15	Whether power is taken from approved sources (welding receptacles)?				
5.16	Whether welding receptacles are properly grounded?				

5.17	Whether welding cables are maintained in good condition and without any joints/cuts?				
5.18	Whether to avoid short circuit, welding machines are protected against rain?				
5.19	Whether earth connectors are securely connected to the job and not to the adjoining pipeline or structure?				
5.20	Whether flame arrestor of DG set is of approved make and quality?				
5.21	Others				
6.0	SAND / SHOT BLASTING				
6.1	Whether sand blasting is used only after getting approval from competent authority?				
6.2	Whether air compressor used for sand / shot blasting are positioned away from work place?				
6.3	Whether exhaust of the prime mover is directed away from the work place?				
6.4	Whether in case of motor driven compressor, the body of the motor as well as the compressor is properly earthed?				
6.5	Whether line operator of sand/shot blasting wear suitable PPEs including mask?				
6.6	Whether adequate measures are adopted to confine dust/spray particles?				
6.7	Whether adequate measures are taken for proper ventilation while the work is done in confined space?				
6.8	Others				
7.0	SAFETY WHILE WORKING AT HEIGHTS / SCAFFOLDING / LADDERS				
7.1	Whether work permit is obtained to take up work at height above 3 mts?				
7.2	Whether steel pipes scaffoldings are used in unit/off site areas?				

7.3	Whether provision for suitable platform with all scaffoldings are made? Whether its construction is as per specification with toe board and railing?				
7.4	Whether the area below working at height is cordoned?				
7.5	Whether suitable platform is provided?				
7.6	Whether ISI approved quality and good condition safety belts are used while working at heights?				
7.7	Whether life line of safety belt is Anchored to an independent secured support capable of withstanding load of a falling person?				
7.8	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person?				
7.9	Whether ropes used are of good condition and adequate strength free of defects?				
7.10	Whether ladder is placed at secured and leveled surface?				
7.11	Whether it is extended 1.5 Mts. Above the landing point?				
7.12	Whether ladder used are of adequate length and tying short ladder is avoided?				
7.13	Whether metallic ladders are placed away from electrical system?				
7.14	Whether tools or materials are removed after completion of the day's job at heights?				
7.15	Whether a valid permit is obtained before taking up work on asbestos or fragile roof?				
7.16	Whether sufficient precaution is taken while working on fragile roof?				
7.17	Whether provision is made to arrange duck ladder, crawling board for working at fragile roof?				
7.18	Whether scaffolding has been erected on rigid / firm / levelled surfaces only?				

7.19	Whether scaffold has been inspected by competent person prior to being put in use?				
7.20	Whether the scaffolding has been designed for the load to be borne?				
7.21	Whether the erection and dismantling of the scaffolding is being done only by trained persons and under supervision?				
7.22	Whether safety net with proper working arrangement and life line has been provided?				
7.23	Others				
8.0	SAFETY IN CONFINED SPACE				
8.1	Whether a permit is obtained to enter a confined space?				
8.2	Whether gas test for hydrocarbon, toxic gas, oxygen level is obtained before entering any confined space?				
8.3	Whether adequate oxygen level is ensured in confined space before entering? If not, whether all precaution like using of Breathing Apparatus set is ensured?				
8.4	Whether, in case of chance of ingress of hydrocarbon gases / toxic gases, Personnel Monitoring System (PMS) is used or not?				
8.5	Whether only in presence of a supervisor, worker enters in confined space?				
8.6	Whether provision of sufficient means of entry and exit is available?				
8.7	Whether provision of ventilation to remove welding fumes, dust, exhaust gases are made?				
8.8	Whether provision of 24V (Hand lamps with cage as per OISD-STD-155) light for working inside space is made?				

8.9	Is it strictly ensured that a stand-by trained person is standing outside before a person enters a confined space and communication is being maintained all the time with workers working inside?				
8.10	Whether life belt with one end under control of stand-by person outside is kept while working in confined space?				
8.11	Whether Personnel protective Equipment are in good condition as specified in the permit?				
8.12	Whether absence of Hydrogen Sulfide, CO or other toxic gas is ensured before entering into a confined space? If yes, whether proper required PPE like BA, Gas Mask are used.				
8.13	Whether boxing up is being done only as per the approved procedures and by competent persons?				
8.14	Whether all the safety precautions listed in OISD-GDN-192 are taken while working in sewers, OWS etc.?				
8.15	Whether proper house keeping is being maintained inside the confined space?				
8.16	Whether training has been provided to workers working in the confined space and the workers only of sound health are being asked to work in the confined space?				
8.17	Others				
9.0	SAFETY IN MATERIAL HANDLING				
9.1	Whether all lifting tools, tackles, machines, chains, ropes etc. are of sound construction, made of sound material and maintained in good condition?				
9.2	Whether safe working load, date of testing visibly marked/painted on the equipment?				
9.3	Whether lifting tools, tackles are of adequate strength for the load to be handled?				
9.4	Whether all parts including the working gears fixed or movable of every lifting machine, chain, rope, tackles specify the				

	<p>following condition:</p> <p>a) Thoroughly examined by competent person at least once a year or such interval as required by statutory authority.</p> <p>b) Document of such examination are maintained and produced to owner supervisor before use of particular equipment?</p>				
9.5	Whether chain blocks and cables are inspected before each use to assure their sound condition?				
9.6	<p>Whether hoist and lift if used are:</p> <p>a) Properly maintained and thoroughly examined by competent authority at least once in every year.</p> <p>b) A register to be maintained to record particulars of such examination in prescribed forms and shall be produced to the owner supervisor before use.</p>				
9.7	Whether area below the movement of boom of crane is cleared to avoid injury from falling objects?				
9.8	Whether it is ensured that crew of truck leave the truck in crane handling area before starting loading / unloading, if not involved in rigging operation?				
9.9	Whether transporting material from one place to another is done by suitable means?				
9.10	Whether carrier with sufficient capacity without projecting parts is used for transporting materials?				
9.11	Whether riggers engaged are well trained and conversant with signaling procedures including night signalling if required?				
9.12	Whether permission of authorized person is obtained before working on or near an overhead crane?				
9.13	Whether trained riggers are available all the time along with crane?				

9.14	Whether barricading has been done to ensure no unauthorised person enters in the working area of the crane?				
9.15	Whether lifting plan has been prepared and approved before start of the work?				
9.16	Whether route of crane movement has been planned before the crane moves out of the garage?				
9.17	Whether it has been ensured that no electrical cable come within 3 metres or safe distance from the boom of the crane?				
9.18	Whether boom is being kept in the horizontal position or locked while idling?				
9.19	Whether material is being stacked / destacked in trucks with the help of wedges to ensure no slippage while loading / unloading takes place?				
9.20	Whether the forklift / crane is being operated only by trained person?				
9.21	Others				
10.0	ELECTRICAL SAFETY				
10.1	Has the Electrical Line Clearance procedure been followed involving electrical and other concerned Dept. and filling of formats?				
10.2	Have Danger Signs with Voltage rating/ Men at work signboards been displayed at both Sub Station as well as the work site?				
10.3	Has the contractor worker understood the electrical circuit on which he is going to work with probable electrical hazards and mitigation measures to be adopted?				
10.4	Whether contractor has engaged electrician (s) having valid electrical licence in line with provisions in Indian Electricity Rules?				

10.5	Have all checks prior to switching operation been carried out and authorisation of owner/ user section obtained subsequently?				
10.6	Have all earthing links on electrical conductors removed before charging the line/ apparatus?				
10.7	Have PPE as prescribed under Indian Electricity Rules been in place, kept healthy and used?				
10.8	Are earthing and bonding arrangement of non-current carrying metallic parts in line with provisions of Indian Electricity Rules – 1956 amended time to time as IS: 3043?				
10.9	Have electrical part of OISD-GDN-192 and Clause No. 9.0 for Temporary installations in OISD-173 been understood and followed wherever applicable?				
10.10	Are flexible wires having voltage of 240 volts above earth potential taken through PVC conduits?				
10.11	Whether portable hand lamps with a voltage rating of not more than 24 volts used with flameproof enclosures in confined spaces within columns, vessels etc?				
10.12	Have the Switches, MCBs, fuses etc. been inspected for proper ratings?				
10.13	Has Earth Leakage Circuit Breaker (ELCB) been used on the incoming side to protect against leakage of current? Is the device tested every time the work is started?				
10.14	Whether all portable appliances are provided with insulated Three pin Plugs and socket arrangement?				
10.15	Whether industrial type extension boards and plug sockets are used?				
10.16	Has the electrical equipment brought to site by contractor been inspected by owner's supervisor/ safety officer for damage/cuts/abrasion etc? Is record of				

	Insulation Resistance, wherever required , being kept?				
10.17	Have standard practices for termination of conductors/ cables been followed (e.g. use of proper lugs, crimping tool, cable glands etc)? Is cable armour in continuity from feeding point to load?				
10.18	Are the Contractor supervisor and workmen well acquainted with first aid for electrical shock?				
10.19	Are the wires/ cables identifiable along their route towards the load by using colour coding and/or markers?				
10.20	Others				
11.0	ROAD WORK				
11.1	Whether site is barricaded and provided with warning signs including night warning lamps/ self glowing markers at appropriate location for diversion of traffic?				
11.2	Whether mixing aggregates with bitumen is done with the help of batch mixing plants? If no, whether adequate precautions have been taken?				
11.3	Whether road rollers, bitumen sprayers, pavement finishers are driven by experienced drivers with valid driving licenses?				
11.4	Whether the worker handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate are provided with PVC hand gloves rubber shoes with pegging upto knee joints?				
11.5	Others				
12.0	FORM WORK, REINFORCEMENT				
12.1	Whether form work, shuttering, shoring etc. are adequately designed and provided to erect the structure and to support the expected load?				

12.2	Whether staging (support) for shuttering is designed for loads like worker movement, impact load and other incidental loads during construction?				
12.3	Whether workers use PPEs at work site?				
12.4	Whether all safety procedures are adopted while cutting rod?				
12.5	Whether proper staging and bundling is provided for supplying rods at height?				
12.6	Whether sufficient cross bracings are provided for high staging works at vulnerable points?				
12.7	Others				
13.0	CONCRETING				
13.1	Whether the concreting area is barricaded?				
13.2	Whether vibrator hoses, pumping concrete accessories are in healthy condition and mechanically strong?				
13.3	Whether it is ensured that no pipe line in concrete pumping system is attached to any temporary strut such as scaffolds etc.?				
13.4	Whether it is checked that safety guards around moving parts are provided in concrete mixer/ machines?				
13.5	Whether earthing of electrical mixers, vibrator etc. are checked?				
13.6	Whether entry of unauthorised person in the concreting area is restricted?				
13.7	Whether adequate lighting arrangement is made in the concreting area if working during night?				
13.8	Whether PPEs like gum boots, gloves and dust masks etc. are being used?				
13.9	For overhead or underground work, whether form work and shuttering have been checked so that the same do not collapse during concreting?				

13.10	Others				
14.0	DEMOLISHING (DEMOLISHING BY BLAST NOT CONSIDERED)				
14.1	Has the stability of structure been examined by competent person and found OK?				
14.2	Are non-sparking tools being used, if required?				
14.3	Is intermittent clearing operation being done to keep the area reasonably tidy and clean?				
14.4	Whether effective barricading has been provided?				
14.5	Whether Electrical and other facilities like water, oil, gas pipelines have been isolated/protected?				
14.6	Whether the plan of demolition (including sequence of activities) has been prepared and approved prior to start of the work?				
14.7	Others				
15.0	RADIOGRAPHY				
15.1	Are safety precautions for handling of source as per guidelines of BARC being followed?				
15.2	Is the potency of the source being used within acceptable limits as per the BARC regulations?				
15.3	Is the area being cordoned with proper signs during radiography?				
15.4	Does proper place exist as per BARC regulations for storage of source / Personnel safety equipment?				
15.5	Does the radiographer has valid certificate of radiography from competent authority (BARC)?				
15.6	Is radiographer using Exposure Meter / Dosi Meter?				
15.7	Whether minimum occupancy of the				

	premises / workplace is being ensured while radiography is in progress?				
15.8	Is permit system being followed?				
15.9	Others				
16.0	ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS				
16.1	Are jobs being carried out with a valid work permit only as per OISD-STD-105 "Work Permit System".				
16.2	Is smoking prohibited in all places containing combustible or flammable materials and "No Smoking" notices prominently displayed.				
16.3	Are only approved type electrical installations and equipment, including portable lamps, being used?				
16.4	Are oily rags, waste, wooden materials and clothes or other substances liable to spontaneous ignition being removed?				
16.5	Are the combustible materials properly shielded in case same cannot be removed from the area?				
16.6	Has welding screens (like metal/asbestos/ water curtain) been put up to protect other equipment / facilities/ OWS/ drains in adjoining areas against flying sparks, as may be required?				
16.7	Is Gas-testing being done with the means of a calibrated Gas detection Meter prior to start of Hot work and being done subsequently at regular intervals as per the requirement?				
16.8	Are regular inspections being done of places where there are fire risks like in the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations?				
16.9	Are fire-extinguishing equipment being placed at strategic locations and are kept well maintained and inspected at suitable intervals by a competent person.				
16.10	Are access to fire-extinguishing equipment such as hydrants, portable				

	extinguishers and connections for hoses kept clear at all times?				
16.11	Are all supervisors and a sufficient number of workers trained in the use of fire-extinguishing equipment?				
16.12	Are audio means, to give warning in case of fire provided, audible in all parts of the site where persons are liable to work?				
16.13	Is there an effective evacuation plan in place so that all persons are evacuated speedily without panic?				
16.14	Others				
17.0	EMERGENCY PROCEDURES				
17.1	Is signaling / siren system effective?				
17.2	Is arrangement for rescuing affected person adequate?				
17.3	Are signs showing emergency exit route installed?				
17.4	Is emergency exit route clear of obstacles?				
17.5	Is communication system adequate?				
17.6	Whether emergency vehicle with driver has been provided to meet any emergency situation?				
17.7	Does any tie-up with hospitals or local doctors exist?				
17.8	Has the assembly point for workers in case of emergency been identified and earmarked?				
17.9	Has training been provided to a few workers for First Aid?				
17.10	Others				
18.0	WELFARE FACILITIES				
18.1	Is hygienic conditions prevailing at labour camps?				
18.2	Are First Aid facilities available?				

18.3	Does proper sanitation exist at site office and labour camps?				
18.4	Does any arrangement of medical facilities like tie ups with nearby hospital exist?				
18.5	Is proper drinking water facility available for workmen & staff?				
18.6	Are crèches provided for children (if applicable)?				
18.7	Is any proper place/canteen/restroom provided for eating food and taking rest?				
18.8	Is any place earmarked for storing / keeping clothing?				
18.9	Is Adequate washing facility available?				
18.10	Does proper ventilation at working place exist?				
18.11	Others				
19.0	GENERAL				
19.1	Are illumination levels at workplace and passages adequate?				
19.2	Is communication system adequate?				
19.3	Are display and caution boards provided at strategic locations?				
19.4	Are road barriers being used for blocking any roads/passage?				
19.5	Has the structure been adequately secured against storm/high winds during construction/ erection?				
19.6	Are the equipment properly earthed?				
19.7	Are vehicles being checked like brakes, oil, lights etc. on regular basis?				
19.8	Is compressed air being used only for its intended purpose and not for any other purpose?				
19.9	Are only proper clothes and not loose clothes being used while working around				

	machinery?				
19.10	Are nails or other sharp objects being removed or bent?				
19.11	Are machine guards over moving parts of machinery such as coupling, pulley, wheel etc. installed?				
19.12	Whether after maintenance of machinery the guards are securely fitted before putting into operation?				
19.13	Are working platforms / gangways provided with hand rails & toe guards?				
19.14	Are swing platforms provided with chains & secured adequately when not in use?				
19.15	Are the approaches to work sites being maintained & kept clear of obstacles?				
19.16	Whether engines of equipment entering into the operating area have exhaust and muffler system with approved spark arrestor?				
19.17	Whether vehicles/engine driven equipment, electrical equipment and tools used are certified?				
19.18	Whether contractors inform his workers about hazards and safe procedures?				
19.19	Whether sufficient care is taken so that spark do not go outside working enclosure & falls below?				
19.20	Whether contractor's qualified / trained supervisor is present?				
19.21	Whether all exhausts of engines are provided with approved type of flame arrestors and exhaust is not facing toward the place where the workers are working?				
19.22	Others				

Signature of the Auditor

**QUALIFICATION & EXPERIENCE
REQUIREMENT OF KEY CONSTRUCTION
PERSONNEL AND PENALTY FOR THEIR NON-
MOBILIZATION**

[ANNEXURE - VI TO SPECIAL CONDITIONS OF ONTRACT]

प्रमुख निर्माण कार्मिकों के लिए अपेक्षित योग्यता एवं अनुभव और तैनाती न करने पर जुर्माना

QUALIFICATION & EXPERIENCE REQUIREMENT OF KEY CONSTRUCTION PERSONNEL AND PENALTY FOR THEIR NON- MOBILIZATION

0	12.06.2015	Issued as Standard	DJ	RK	MD	SC
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	

Abbreviations:

CV	:	Curriculum Vitae
EPC	:	Engineering, Procurement & Construction
EPCC	:	Engineering, Procurement, Construction & Commissioning
ISO	:	International Organization for Standardization
NDT	:	Non Destructive Testing
QA/QC	:	Quality Assurance /Quality Control
RT	:	Radiography Testing
UT	:	Ultrasonic Testing

Construction Standards Committee

Convenor: Sh. M Deshpande, ED (Construction)

Members: Sh. S N Bhatnagar, GM (Construction)
Sh. Rakesh Nanda, GM (Piping)
Sh. Rajeev Jain, DGM, (C&P)
Sh. Janak Kishore , DGM (Projects)
Sh. Ravindra Kumar, AGM (Construction)
Sh. D Jana, AGM (Construction)

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1. QUALIFICATION & EXPERIENCE (POST QUALIFICATION)

CATEGORY	QUALIFICATION & EXPERIENCE (POST QUALIFICATION) REQUIRED			
Resident Construction Manager/ Resident Engineer/Site-In-Charge	Degree or Diploma in Engineering with minimum following relevant experience in construction:			
	Contract value (Rs) →	< 5 Cr. works	5-20 Cr. works	> 20 Cr. works
	Degree holders	5 yrs	10 yrs	15 yrs
	Diploma holders	8 yrs	13 yrs	20 yrs
Lead Discipline Engineer (Mechanical, Civil, Electrical, Instrumentation)	Degree or Diploma in relevant Engineering discipline with following minimum experience in Construction:			
	Contract value (Rs) →	≤ 20 Cr. works	> 20 Cr. works	
	Degree holders	5 yrs	10 yrs	
	Diploma holders	8 yrs	13 yrs	
Lead Welding/ NDT Engineer	Degree or Diploma in Mechanical Engineering/ Metallurgy with the following experience in Welding & NDT (Non Destructive Testing) and possessing valid Level-II certificate in the relevant NDT methodology (RT/UT)			
	Contract value (Rs) →	≤ 20 Cr. Works	> 20 Cr. Works	
	Degree holders	5 yrs	10 yrs	
	Diploma holders	8 yrs	13 yrs	
Lead QA/QC Engineer	Degree in Engineering with following experience (refer Note 1 also):			
	Contract value (Rs) →	≤ 20 Cr. Works	> 20 Cr. Works	
	Experience	5 yrs of construction experience of which 2 years in QA/QC	10 yrs of construction experience of which 3 years in QA/QC.	
Lead Planning Engineer	Degree in Engineering with following experience in Planning & Scheduling:			
	Contract value (Rs) →	≤ 20 Cr. works	> 20 Cr. works	
	Experience	5 yrs.	8 yrs.	
Safety Officer/ Supervisor	As per specification for HSE Management at construction sites enclosed elsewhere in the bid.			
Warehouse- In- Charge/ Materials Manager	Diploma in Engineering or Diploma in Materials Management or Graduate in any stream with min. following experience in Warehousing/ Stores Management:			
	Contract value (Rs) →	≤ 20 Cr. works	> 20 Cr. works	
	Experience	5 yrs.	10 yrs.	
Quantity Surveyor	Degree or Diploma in Engineering with minimum following experience in quantity estimation, field measurement, rate analysis, bill preparation etc. in Construction field:			
	Contract value (Rs) →	≤ 20 Cr. works	> 20 Cr. works	
	Degree holders	2 yrs.	5 yrs.	
	Diploma holders	5 yrs.	10 yrs.	
Discipline Engineer (Including welding/ NDT, QA/QC and Planning)	Degree in relevant Engineering Discipline with minimum 2 years of relevant experience in construction or Diploma in relevant Engineering Discipline with minimum 4 years of relevant experience in Construction. Welding /NDT engineer shall possess valid Level-II certificate in the relevant NDT methodology (RT/UT)			

Notes: (for Table on previous page)

1. For Mechanical, Composite, EPC or EPCC Contracts of value more than Rupees 20 crores, the Lead QA/QC Engineer shall be a qualified internal auditor for ISO 9001.
2. CVs of key construction personnel proposed to be deployed shall be submitted to Owner/Engineer-in-Charge prior to their mobilization at site. The mobilization of key personnel shall be done at site subject to prior approval of their CVs by Owner/Engineer-in-Charge.

2. PENALTY FOR NON - MOBILIZATION OF KEY CONSTRUCTION PERSONNEL

Penalty for non-mobilization per day per person after the contractual mobilisation period / mobilisation schedule agreed during Kick off Meeting / jointly agreed between contractor and PMC / owner based on front availability etc.

- Rs. 5000/- for Resident Construction Manager/ Resident Engineer/ Site-in-Charge;
- Rs. 3000/- for Lead QA/QC Engineer, Lead Planning Engineer, Warehouse In-charge Lead Discipline Engineer, Lead Welding/ NDT Engineer and the Quantity Surveyor
- Safety Officer (As per HSE Specification)

Notes: (for Penalty clauses)

- a) All intervening off days (Sundays etc.) and holidays will be counted for levy of penalty
- b) Mobilised personnel shall not be demobilised till contractual completion or based on consent of Engineer-in-Charge else penalties as above shall be applied.
- c) Total of above penalties shall not exceed 3% of the contract value.
- d) The above penalties are over & above all other contractual provisions with respect to penalties.

Annexure -VIII - A

CONTRACT CLAUSE FOR ACCEPTANCE OF STRUCTURAL STEEL AND TMT BAR MANUFACTURERS.

1. Steel manufacturers having valid BIS certificate and listed in the BIS website as on date of procurement of steel shall be allowed for supply of steel (Structural steel and TMT bars) and contractor shall procure from them with prior intimation to Engineer-in-charge.

2. Tests after receipt of structural steel at site:

In addition to availability of valid BIS license and MTC, for each category / size of structural steel procured, one sample from every 50 MT or part thereof shall be drawn and tested in approved laboratory. The charges for such testing shall be borne by the contractor.

3. Tests after receipt of TMT bars at site:

In addition to availability of valid BIS license and MTC, sample as specified under shall be drawn and tested in approved laboratory. The charges for such testing shall be borne by the contractor.

- Under 10 mm bars one sample for each 25 MT (or part thereof) for consignment below 100 MT and one sample each 40 MT (or part thereof) for consignment above 100 MT shall be tested.
- For 10 mm to 16 mm bars, one sample for each 35 MT (or part thereof) for consignment below 100 MT and one sample each 45 MT (or part thereof) for consignment above 100 MT shall be tested.
- Over 16 mm bars one sample for each 45 MT (or part thereof) for consignment below 100 MT and one sample each 50 MT (or part thereof) for consignment above 100 MT shall be tested.

Annexure VIII-B

CONTRACT CLAUSE FOR ACCEPTANCE OF CEMENT MANUFACTURERS.

1. Cement manufacturers having valid BIS certificate and listed in the BIS website as on date of procurement of cement shall be allowed for supply of cement and contractor shall procure cement from them with prior intimation to Engineer-in-charge.
2. Tests after receipt of cement at site: Each batch of cement (week wise as mentioned on cement bags) supplied by the contractor after delivery at site shall be subjected to the tests and analysis required by the relevant Indian Standard Codes. The contractor shall carry out and bear the cost of all tests and analysis to ensure quality of cement before using in actual works.

APPROVAL OF CONSTRUCTION SUB- CONTRACTOR

(ANNEXURE – IX TO SPECIAL CONDITIONS OF CONTRACT)

FORMAT – I

- 1) NAME OF MAIN CONTRACTOR : _____
- 2) NAME OF WORK, LOCATION : _____
- 3) NAME OF PROPOSED SUB-CONTRACTOR : _____
- 4) SCOPE OF WORK PROPOSED TO BE SUB-CONTRACTED (BRIEF) : _____
- 5) ESTIMATED VALUE OF THE PROPOSED WORK TO BE SUB-CONTRACTED (INR) : _____
- 6) QUALIFYING CRITERIA FOR SUB-CONTRACTOR:
 - i) Similar work experience in relevant works:
Completed **one job** of completed Contract value of not less than **50 %** of value of proposed work (as quoted by the main contractor) to be sub-contracted, in preceding seven years
or
Completed **two jobs** each of completed Contract value of not less than **30 %** of value of proposed work (as quoted by the main contractor) to be sub-contracted, in preceding seven years
 - ii) Annual Turnover
Not less than **100%** of value of proposed work (as quoted by the main contractor) to be sub-contracted, as per audited annual financial results, in any one of the preceding three financial years, on annualised basis.

Net Worth
The Net Worth of the proposed sub-contractor as per the immediate preceding year's audited financial results should be atleast 10% of the annualized value of proposed work (as quoted by the main contractor) to be sub-contracted.

Working Capital
Proposed sub-contractor should have minimum working capital equal to 10% of the estimated annualized value of proposed work (as quoted by the main contractor) to be sub-contracted as per the immediate preceding year's audited financial results.
In case proposed sub-contractor is unable to meet the working capital requirement as above, the proposed sub-contractor can supplement the working capital with a line of credit from any scheduled bank (except Co-operative Bank & Gramin Bank) in India. In such a case, proposed sub-contractor shall furnish a declaration from the Bank for availability of unutilized line of credit for at least 10% of the estimated annualized value of proposed work (as quoted by the main contractor) to be sub-contracted, in the format enclosed in the Bidding Document.

Note : For works having scheduled completion period of less than 12 months, annualization of value of proposed work (as quoted by the main contractor) to be sub-contracted for calculation of Annual Turnover, Net Worth & Working Capital shall not be done.

- 7) Based on above information, we M/s _____ (Name of Main Contractor) propose M/s. _____ (Name of proposed sub-contractor) as our sub-contractor for the above mentioned works. We understand that notwithstanding above approval, we shall remain fully responsible for the performance of the said sub-contractor and any failure of the sub-contractor shall not absolve/ relieve us of our responsibility to complete the works as per the terms and conditions of the Contract.

(NOTE: Bidders to fill all the details in the above proforma. Further, Bidder shall also fill-in the details at Sl.No.5 above based on the estimated value of the proposed work to be subcontracted. Estimate shall be linked to the SOR of the main contract).

(STAMP & SIGNATURE OF CONTRACTOR)

- 8) QUALIFICATION STATUS (TO BE STAMPED BY EIL):

ITEMS QUALIFYING FOR SECURED ADVANCE
[ANNEXURE - X TO SPECIAL CONDITIONS OF CONTRACT]

ITEMS QUALIFYING FOR SECURED ADVANCE

1. CATEGORY : 'A' -- ITEMS AGAINST WHICH SECURED ADVANCE CAN BE GRANTED

A-1 CIVIL

- i) Bricks
- ii) Stone and Brick aggregates
- iii) Stones
- iv) Finished products of brass, Iron or Steel such as doors and window frames, wiremesh, gate, G.I. Sheets.
- v) Precast RCC products such as pipes & fittings, jail, water storage tanks.
- vi) Doors and windows fitting.
- vii) Pipes and sanitary fittings of GI, CI, SCl and HCl.
- viii) Metallic doors/windows
- ix) M.S. Gratings.
- x) Reinforcement bars
- xi) Hydraulic door closures.
- xii) Structural steel.
- xiii) C.I. Flushing Cisterns
- xiv) C.I. Valves, Sluice gates etc.
- xv) Fencing, material, Chain-Link/Barbed wire etc.
- xvi) Anchor bolts and Nuts.

A-2 ELECTRICAL

- i) Steel Conduit
- ii) G.I. Pipes
- iii) C.I. Boxes
- iv) I.C. Boards
- v) Switchgears (Air circuit breakers and Air breaker switches)
- vi) A.C.S.R. Conductors.
- vii) A.C. Plant and Machinery
- viii) Pumps
- ix) Generating sets (without oil)
- x) G.I. Strips
- xi) Street light poles (Steel)
- xii) Cable Trays

A-3 MECHANICAL

- i) Structural Steel
- ii) Plates
- iii) Pumps/motors, vessels etc, Diesel engine, side entry mixers, suction heater & any other mechanical equipment.
- iv) Refractory bricks
- v) S.S. Foil
- vi) Pipes/Pipe fittings
- vii) Gratings
- viii) Valves, Hydrants, Monitors
- ix) Aluminum sheet

A-4 INSTRUMENTATION

- i) Structural steel
- ii) M.S. Sheet/G.I. Sheets
- iii) Prefabricated trays
- iv) Pipes/Tubes/fittings.

2. CATEGORY : 'B'--- ITEMS AGAINST WHICH SECURED ADVANCE CAN BE GRANTED AFTER OBTAINING INSURANCE COVER FROM THE CONTRACTOR

B-I CIVIL

- i) Kitchen sink china vitreous, flush back for wash basin vitreous china, water closet and pedestal type water closet vitreous china, urinals.
- ii) Glazed tiles, terrazzo tiles and similar articles.
- iii) Marble/Kota Stone/Granite slabs
- iv) Asbestos cement products
- v) Finished timber products such as doors, windows, flush doors, particle boards (subject to the mandatory tests being satisfactory).
- vi) Bitumen in sealed drums.
- vii) Bitumen felt
- viii) Polythene pipes and fittings.
- ix) Sanitary fittings and pipes of S.W. Porcelain and chinaware materials.
- x) Laminated/safety one way vision and Bullet proof glasses.
- xi) Chemicals required for antitermite treatment (in sealed drums).
- xii) Paints, Varnishes, Distempers, pigment.
- xiii) Ceiling and false flooring frames and tiles etc.

- xiv) Acid proof tiles
- xv) Bitumen products required for mastic flooring etc.
- xvi) Waterproofing, compounds such as CICO etc.
- xvii) Materials for Grouting, Epoxy finishing etc.
- xviii) PVC Water storage Tanks, PVC tiles, PVC waterbar etc.
- xix) Cement

B-2 ELECTRICAL

- i) Transformers
- ii) Switchgears (Oil filled)
- iii) L.T. & H.T. Cables
- iv) Fans
- v) Storage & Dry Batteries
- vi) Insulation tapes
- vii) Epoxy cable compounds
- viii) Electric light fittings
- ix) Wood battens, casing & capping and wooden boards
- x) Flexible wires
- xi) PVC materials
- xii) Rubber materials
- xiii) Glass wools, thermocol and other insulating materials.
- xiv) Porcelain H.T. and L.T. insulators
- xv) Electric heat tracing tapes
- xvi) Oil and Lubricants.

B-3 MECHANICAL

- i) Bitumen.
- ii) Wrapping & Coating material
- iii) Primer/Paints
- iv) Foam/Foam seal material
- v) Guniting material
- vi) Insulation & Refractory materials other than bricks
- vii) Electrodes

B-4 INSTRUMENTATION

- i) SS/Copper Tubes
- ii) SS/Brass Compression fittings
- iii) Control/Signal Cables
- iv) Junction boxes/Marshalling boxes
- v) Control Panels.

NOTE: The Category "B" shall cover all the above items and any other item not covered in category "A" and "C" and imperishable in nature.

3. CATEGORY : 'C' -- ITEMS AGAINST WHICH NO SECURED ADVANCE SHOULD BE GRANTED

C-1 CIVIL

- i) Glass products other than those indicated in Category 'B'.
- ii) Sand and Mooram.
- iii) Chemical compounds other than those under Category 'B'.

C-2 ELECTRICAL

- i) Glass Globes and Shades.
- ii) Bulbs and Tubes.
- iii) Petrol and Diesel.
- iv) Freon and other Refrigeration gases.

CONDITIONS FOR ISSUE AND RECONCILIATION OF MATERIALS

[ANNEXURE - XI TO SPECIAL CONDITIONS OF CONTRACT]

सामग्री निर्गम एवं रिकोन्सिलिएशन के लिए शर्तें

CONDITIONS FOR ISSUE AND RECONCILIATION OF MATERIALS

1	24.01.2014	Reaffirmed & Issued as Standard	SM	DJ	RKD	SC
0	21.05.2008	Doc. No. 6-10-0001 Rev 0 has been revised and issued as Standard	AS	GKI	SCB	VC
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	

Abbreviations:

MS	:	Mild Steel
OFC	:	Optical Fibre Cable
OTDR	:	Optical Time Domain Report

Construction Standards Committee

Convenor: Sh. RK Das, ED (Construction)

Members : Sh. M Deshpande, GM (Construction)
Sh. M Natarajan, GM (C&P)
Sh. Rakesh Nanda, GM (Piping)
Sh. S Mukherjee, DGM (Construction)
Sh. Janak Kishore, DGM (Projects)
Sh. D Jana, AGM (Construction)

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1.0 CONDITIONS FOR ISSUE OF MATERIALS

Whenever any material is issued by Owner, following conditions for issue of material in addition to other conditions specified in the contract shall be applicable:

- 1.1 Necessary indents shall be raised by the Contractor as per procedure laid down by the Engineer-in-Charge from time to time, when the materials are required for incorporation in permanent works.
- 1.2 Materials shall be issued only for permanent works and not for temporary works, enabling works etc. unless specifically approved by the Engineer-in-Charge.
- 1.3 The Contractor shall bear all other cost including lifting, carting from issue points to work site/Contractor's store, custody and handling etc. and return of surplus/serviceable scrap materials to Owner's storage points to be designated by the Engineer-in-Charge. No separate payment for such expenditure shall be made.
- 1.4 No material shall be allowed to be taken outside the plant without a gate pass.
- 1.5 The Contractor shall be responsible for proper storage, preservation and watch & ward of the materials.

2.0 RETURN OF UNUSED MATERIAL/ SCRAP

- 2.1 All unused/scrap materials shall be the property of the Owner and shall be returned in good and acceptable condition category wise by the Contractor at his own cost to Owner's Store(s).
- 2.2 No credit shall be given to the Contractor for return of scrap. The Contractor should quote the rates accordingly. Contractor shall make his own arrangements for weighing the cut offs to be returned to Owner's stores.
- 2.3 In case the Contractor fails to return unused materials/ accountable scrap, then recovery for such quantity of materials, not returned by the Contractor shall be affected at following penal rates from the Contractor's bills or from any other dues of the Contractor to the Owner:

S. No.	Material		Penal Rates
1.	(a)	Penal rate for non return of accountable scrap	Issue Rate + 25% or Landed Rate + 25% (in case issue rate are not indicated in the contract)
	(b)	Penal rate for return of serviceable materials in excess of permitted % allowances	
	(c)	Penal rate for issuance of unplanned OFC jointing kits	
2.	(a)	Penal rates for non return of Unused material and or penal rate for generating scrap in excess of permitted % allowances	Twice the Issue Rates or Twice the Landed Rates (in case Issue Rates are not indicated in the Contract)
	(b)	Penal rate for using excess amount of materials like cement than permitted % allowances	

NOTE : 1) Landed Rate shall be arrived from the latest Purchase Order of respective material received at site by Owner/EIL.

- 2) In case more stringent penal rates have been indicated elsewhere in the Contract (based on Project requirement), the same shall supersede the above rates.

3.0 CEMENT

- 3.1 Cement as received from cement Manufacturer/Stockists shall be issued to the Contractor. The theoretical weight of cement in each bag for issue purpose shall be considered as 50 Kg or 20 bags per MT. However, cement bags weighing upto 4% less shall be accepted by the Contractors and charged for as full bag.
- 3.2 The Contractor is required to submit the design mix for different grades of concrete, keeping in view the requirements stipulated in IS:456 and IS 10262, specifically regarding durability, slump and water cement ratio and specific gravity of materials brought to site as analyzed in the laboratories. The design shall be based upon absolute volume method and theoretical consumption of cement shall be worked out on this basis. For other than concrete items, the coefficients for consumption of cement shall be adopted as per CPWD practice.
- 3.3 The permissible variation between Cement actually used on the job and theoretical consumption worked out on the basis stipulated in above para 3.2 and as determined by Engineer-in-Charge shall be 3% (Three percent only).

If the actual consumption is more than 103% of the theoretical consumption, then recovery at the penal rates for the quantity of cement beyond the limit of 103% of theoretical consumption shall be affected as per clause 2.3 above.

- 3.4 Unused quantity of cement shall be returned by the Contractor to the Owner's stores in good condition only.
- 3.5 The Contractor shall maintain a good store for storing cement issued to him. The flooring of the storage house, the clearances of cement bags from the side walls/ floor & stack height etc. shall be as instructed by the Engineer-in-Charge.
- 3.6 The contractor shall maintain a Cement Register in prescribed format and update the entries on daily basis.
- 3.7 The cement store shall be offered for inspection and verification by the Engineer-in-Charge or his authorized representative at any time when the Engineer-in-Charge feels the need to do so.
- 3.8 Empty cement bags shall be the property of the Contractor and shall have to be disposed off by him.

4.0 REINFORCEMENT BARS / STRUCTURAL STEEL / PLATES

- 4.1 The scrap allowance for the reinforcement bars/structural steel including steel plate issued by the Owner, shall be total 3% (2.5% accountable and 0.5% unaccountable) of the actual consumption as incorporated in the works.
- 4.2 All serviceable reinforcement bars/structural steel/steel plates shall be issued in available length/shapes/sizes and no claims for extra payment on account of issue of non-standard lengths/shapes/sizes and bending etc. shall be entertained. Reinforcement bars and structural steel shall be issued on weight basis as per normal warehousing practice. In exceptional circumstances, the reinforcement bars/ structural steel, if issued on linear measurement, the IS coefficients for unit weight shall be considered. For the purpose of billing and accounting, only linear measurements shall be taken and weight shall be calculated as per IS coefficients in three decimals. The difference in unit weight as per IS and actual as issued, if any, shall be

to Contractor's account and Contractor is deemed to have considered the same at the time of bidding.

- 4.3 Reinforcement bars/structural steel/steel plates shall be issued only for those items where Owner's supply has been specifically mentioned in Schedule of Rates/ Scope of Supply. The storage of these items shall be done in such a way so as to avoid rusting/ damage to any kind to the materials.

- 4.4 All reinforcement bars/structural steel (except M.S. Plates) in length of 2 meters and above shall be considered as serviceable materials provided the material is in good and acceptable condition. Reinforcement bars/structural steel section (except M.S. Plates) in lengths less than 2M shall be treated as scrap.

The contractor shall strive to avoid generation of cut pieces of length 2m and above, as far as practicable, by effectively planning & executing the construction works.

- 4.5 For the purpose of accounting of the plates, all plates measuring not less than 1 Sq.m in area and having any dimensions not less than 200mm when returned to Owner's store, shall be considered as serviceable material. All other pieces shall be treated as wastage/scrap. The Contractor shall prepare a plate cutting diagram in such a way that the minimum scrap is generated. Also the cut plates should be used at proper places to reduce the scrap.

- 4.6 The serviceable cut pieces as mentioned in 4.4 & 4.5 above shall be considered as unused material for reconciliation purpose.

- 4.7 Material appropriation shall be done and wherever applicable, the recovery at penal rates as per clause 2.3 above shall be affected from the contractor.

5.0 PIPING MATERIALS

- 5.1 All serviceable pipes shall be issued in available lengths/shapes and no claims for extra payments on account of issue of non-standard length & shape shall be entertained. Pipes shall be issued on linear measurement basis. All valves, flanges, fittings etc. shall be issued on number(s) basis. Contractor shall store the materials in such a way so as to avoid mixing of different types of material and shall maintain complete identification and traceability at all times.

- 5.2 The scrap allowance for pipes issued by the Owner shall be 3% (2.5% accountable + 0.5% unaccountable) of the actual consumption as incorporated in the works.

- 5.3 All pipes in length of 2 meters and above shall be considered as serviceable material provided the material is in good and acceptable condition and has clear identification and traceability (Manufacturer's name, heat number/batch number and test certificates). Pipes in lengths less than 2M shall be treated as scrap.

The contractor shall strive to avoid generation of cut pieces of length 2m and above, as far as practicable, by effectively planning & executing the construction works.

- 5.4 All unused/scrap pipes, valves, flanges, forged fittings like elbows, reducers tees shall be returned by the Contractor category wise duly cleaned, greased and spec. marked at his own cost to Owner's stores.

- 5.5 Material appropriation shall be done and wherever applicable, the recovery at penal rates as per clause 2.3 above shall be affected from the contractor.

6.0 EQUIPMENTS

Various equipment/materials intended for the installation shall be received by Owner in unpacked, skid mounted, crated, packed or loose condition and shall be stored in the warehouses and open yards. In general, materials shall be issued to the Contractor in 'as received' condition. It shall be the Contractor's responsibility to draw, load and transport all materials from Owner's designated places of issue to the point of installation and return all packing materials like steel frames, wooden boxes/scrap etc. to Owner's stores.

All materials supplied by the Owner shall be duly protected by the Contractor at his own cost with appropriate preservative like primer, lacquer coating, grease etc. as required.

7.0 CABLES

Appropriation of cables shall be done as follows:

- 7.1 All the surplus and serviceable cables out of the cables quantity(ies) issued by the Owner to the Contractor shall be returned by the Contractor to the Owner's store in good condition and as directed by the Engineer-in-Charge.
- 7.2 The Contractor shall be allowed a cutting/wastage allowance (accountable scrap) of 1.5% for power cables and 3% for the control cables. This cutting/wastage allowance shall be computed on the length of cables actually laid, measured and accepted.
- 7.3 All cables being returned to store should carry Aluminium sheet tags indicating the size & type of cable. Cables of less than 15 meters length shall be termed as scrap. Cables of lengths 15M and above shall be termed as serviceable material & shall be returned size wise and category wise to the Owner's store in wooden drums. Cables of serviceable length being returned to stores in drum(s) shall be accepted only after Megger value continuity test and physical measurement is carried out by the Contractor to the satisfaction of Engineer-in-Charge. Empty cable drums and major packing material (as decided by Engineer-in-charge) shall be Owner's property and shall be returned to Owner's Store/designated place without any additional cost.

The contractor shall strive to avoid generation of cut pieces of length 15m and above, as far as practicable, by effectively planning & executing the construction works.

- 7.4 While carrying out material appropriation with the Contractor, the above points shall be taken into account. All serviceable materials returned by the Contractor (size wise & category wise) shall be deducted from the quantity(ies) issued to the Contractor for the respective sizes. Scrap generated for power cable and control cable shall also be returned to Owner's store on Lot basis. Wherever applicable, the recovery at penal rates as per clause 2.3 above shall be affected from the contractor.

8.0 LINE PIPES

- 8.1 All bare/ coated line pipes as per Line Pipe specifications shall be issued on linear measurement basis. The serviceable line pipes shall be issued in available lengths and shapes and no claim for extra payment on account of issue of non-standard length and shape shall be entertained. Contractor shall store and maintain the line pipes in proper manner to avoid mixing of different classes of pipes. Contractor shall maintain complete identification and traceability at all times. All cut pieces when returned to Owner's storage points after beveling, shall be considered as serviceable material provided:

- a) Corrosion Protection Coating is intact.

- b) Pipe pieces have pipe specifications, manufacturer's logo/name and heat number duly authenticated with hard stamp of the authorized inspector as per approved procedure.

All cut pieces of pipes measuring less than 2 M shall be treated as wastage/scrap.

The contractor shall strive to avoid generation of cut pieces of length 2m and above, as far as practicable, by effectively planning & executing the construction works.

- 8.2** For the purpose of accounting of bare/ coated line pipes, following allowances shall be permitted:

- | | | |
|----|--|-------|
| a) | Unaccountable wastage | |
| - | upto 100 Km | 0.1% |
| - | 101 to 500 Km | 0.07% |
| - | beyond 500 Km | 0.05% |
| b) | Scrap (All cut pieces of pipes measuring less than 2 Meter) | 0.25% |
| c) | Serviceable materials (All cut pieces of pipe measuring 2 Meter and above) | 0.5% |

The percentage allowance shall be accounted on the basis of pipe book chainage for main pipeline.

- 8.3** Material appropriation shall be done and wherever applicable, the recovery at penal rates as per clause 2.3 above shall be affected from the contractor.

9.0 OPTICAL FIBRE CABLE

- 9.1** For the purpose of accounting of optical fibre cable, all cut pieces measuring in length of 40 m and above when returned to Owner's storage points shall be treated as serviceable materials. All cut pieces of cable measuring less than 40 M shall be treated as scrap.

For the purpose of accounting of OFC (Optical Fibre Cable) following allowances shall be permitted:

- | | | |
|----|---|-------|
| a) | Unaccountable wastage | 0.5% |
| b) | Scrap (All cut pieces of cables measuring less than 40 M) | 0.25% |
| c) | Serviceable material (measuring 40m to 750m) | 0.25% |

The percentage allowance shall be accounted on the basis of pipe book chainage for main pipeline.

Cables returned in original drum (measuring 750m and above) with Optical Time Domain Report (OTDR) shall be considered as unused material.

- 9.2** The contractor shall strive to avoid generation of cut pieces of length 40m and above, as far as practicable, by effectively planning & executing the construction works.

- 9.3** Material appropriation shall be done and wherever applicable, the recovery at penal rates as per clause 2.3 above shall be affected from the contractor.

10.0 OFC JOINTING KITS

The Contractor shall make a schedule for use of Cable jointing kits and get the same approved from Engineer-in-charge. The quantity mentioned in this schedule shall be termed as 'planned' usage quantity which shall be issued to the Contractor. However, any jointing based on site requirements as decided by Engineer-in-charge shall be included in planned quantity.

Any unplanned jointing required to be carried out by the Contractor due to reasons not attributable to Owner/EIL shall be issued from spare quantity, if available with Owner. Such unplanned OFC Jointing Kits shall be charged from the contractor at penal rates as per clause 2.3 above.

Amendment-1 to GCC&SCC
"Implementation of Zero Liquid Discharge (ZLD) at RFCL Site"

S.No	Page no.	Clause No	For	Read As	Remarks
1	GCC & SCC	GCC and SCC Documents	EIL	PDIL	
2	GCC & SCC	GCC and SCC Documents	Owner as EIL	Owner as RFCL	
3	SCC page 06 of 27	SCC 3.1.1	No water and electricity shall be provided to the contractor by the owner	<p>Construction water shall be supplied at one point at plant battery limit on non-chargeable basis. Further distribution shall be in LSTK Contractor's scope.</p> <p>Construction power shall be provided at single point at 415V (1 no. feeder) on chargeable basis. Further distribution shall be in LSTK Contractor's scope.</p> <p>Rate of Electricity: INR 15 per unit.</p>	
4	SCC page 06 of 27	SCC 3.1.3	Owner shall provide space for Contractor field office, fabrication yard and storage yard etc. only at site as per availability of land. No land shall be provided for accommodation purpose of works in all respect.	<p>Office space shall be provided on chargeable basis @ INR 65 per square meter per month. (Subject to revision w.e.f. 01.04.2024)</p> <p>Warehouse space shall be provided as per availability of land on chargeable basis @ INR 65 per square meter per month. (Subject to revision w.e.f. 01.04.2024)</p>	



				Accommodation for contractor's staff in RFCL Township can be provided (subject to availability) on chargeable basis as below: Type "C" quarters: INR 4541.18 per month per Flat. Type "B" quarters: INR 3210.84 per month per Flat. Additionally, water charges shall be @ INR 100 per month per Flat. Electricity charges as per applicable rate for township flat on actual consumption basis.	
5	SCC page 06 of 27	SCC 3.1.5	Notwithstanding above, Construction Water, if available, shall be provided by Owner on chargeable basis at a single point as per convenience of the Owner. Further, distribution network shall be arranged by Contractor at his own cost with prior permission of Engineer in-charge. Rate of Construction Water, if provided by Owner, shall be Rs. 35 / m3 plus GST, as applicable.	Stands deleted	
6	SCC page 10 of 27	SCC 10.3	The evaluation and ordering shall be carried out based on the rate of customs duty considered by the bidder.	Rate of custom duty for imports by the bidder shall not be considered for evaluation of Bid. However, Invoice and supporting documents (Bill of Entry, Commercial Invoice, Bill of Lading or Airway Bill, Import License etc.) shall be submitted by the contractor for all imported parts/supplies.	
7	SCC page 13 of 27	SCC 15.2	To be added with existing	All statutory approval/clearance fee shall be paid by LSTK contractor and same shall be reimbursed by RFCL on actual basis after submission of documentary evidence for payment done to Statutory agencies by the LSTK contractor.	New addition



8	SCC page 19 of 27	SCC 41.0 & 41.1	Owner shall arrange Comprehensive Marine Cum Erection Insurance (MCE) policy, therefore insurance shall be excluded from the Contractor's scope. Insurance during transit (for the goods being dispatched to RFCL Project site), storage at site and erection of all the material and equipments to be incorporated in permanent works shall be covered under above MCE insurance policy by Owner.	Contractor shall arrange Comprehensive Marine Cum Erection Insurance (MCE) policy; therefore, insurance shall be included in the Contractor's scope. Insurance during transit (for the goods being dispatched to RFCL Project site), storage at site and erection of all the material and equipments to be incorporated in permanent works shall be covered under above MCE insurance policy by Contractor.	
9	GCC page 113 of 142	GCC 36.12	Terms applicable to Consortium Contractors	Stands deleted	
10	SCC Page no. 8 to 11	10.0	Taxes, duties and levies	Stands replaced with Annexure-I (attached).	



10.0 TAXES, DUTIES AND LEVIES

Provisions mentioned in the General Conditions of Contract (GCC) shall stand modified to the following extent:

10.1 The quoted price shall be deemed to be inclusive of all taxes and duties except "Goods and Services Tax" (hereinafter called GST) (i.e., IGST or CGST and SGST/UTGST applicable in case of interstate supply or intra state supply respectively and GST compensation Cess if applicable).

Except as specifically provided to the contrary in the Special Conditions of Contract,

- (i) Contractor shall within their quoted price be liable to pay and bear any and all duties, taxes, levies and cesses lawfully payable on any goods, equipment or materials imported into India or within any local limits for permanent incorporation in the work(s), and on materials sold and supplied to the Owner pursuant to the contract.
- (ii) The Contractor shall within their quoted price be liable to pay and bear any and all duties, taxes, levies and cesses lawfully payable on any goods or equipment imported into India or within any local limits for use in the performance of the work(s), and on services performed pursuant to the contract.
- (iii) the Contractor shall be liable for and shall pay any and all Indian fees, cesses, taxes, duties and levies assessable against Contractor in respect of or pursuant to the Contract.
- (iv) In addition, the Contractor shall be responsible for payment of all Indian duties, levies, and taxes assessable against the Contractor or Contractor's employees or Sub-contractor's whether corporate or personal or applicable in respect of property.
- (v) The Contractor shall accept full and exclusive liability at his own cost for the payment of any and all taxes, duties, cesses and levies howsoever designated, as are payable to any government, local or statutory authority in any country other than India as are now in force or as are hereafter imposed, increased or modified and as are payable by the Contractor, his agents, Subcontractors and Suppliers and its/their respective employees for or in relation to the performance of this Contract. The Contractor shall be deemed to have been fully informed with respect to all such liabilities and shall further be deemed to have considered and included the same in his bid and the quoted Price shall not be varied in any way on this account.

Any errors of interpretation of applicability of taxes/ duties by the CONTRACTOR shall be to CONTRACTOR's account.

10.2 Goods and Services Tax (GST):

Contractor shall be required to issue tax invoice in accordance with GST Rules so that input credit can be availed by RFCL. In the event that the Contractor fails to provide the invoice in the form and manner prescribed under the GST Act read with GST Invoicing Rules thereunder, RFCL shall not be liable to make any payment on account of GST against such invoice.

GST shall be paid against receipt of tax invoice and proof of payment of GST to Government. In case of non-receipt of tax invoice or non payment of GST by the Contractor, RFCL shall withhold the payment of GST.

GST payable under reverse charge for specified services or goods under GST act or rules, if any, shall not be paid to the Contractor but will be directly deposited to the Government by RFCL.

Further, GST payment shall be limited to the amount worked out at the quoted rate on the ceiling amount (on which GST is applicable) quoted by the Bidder as per FORM SP-2. In case of reverse charge, wherein RFCL has to pay GST over & above the GST worked out at the quoted rate on the ceiling amount quoted by the Bidder, such extra amount shall be deducted/ setoff / recovered against any amounts paid or payable by RFCL to Contractor (or from any other Securities like Bank Guarantees available to RFCL).

Where RFCL has the obligation to discharge GST liability under reverse charge mechanism and RFCL has paid or is /liable to pay GST to the Government on which interest or penalties becomes payable as per GST laws for any reason which is not attributable to RFCL or input tax credit with respect to such payments is not available to RFCL for any reason which is not attributable to RFCL, then RFCL shall be entitled to deduct/ setoff / recover such amounts against any amounts paid or payable by RFCL to Contractor (or from any other Securities like Bank Guarantees available to RFCL).

Every invoice of the Contractor shall contain invoice number, date, GSTIN number and HSN / SAC code (Harmonized system of Nomenclature / service accounting code) for the items being supplied or services being provided along with tax rate.

The Contractor shall mention their registration status (Registered / Composition/Unregistered) on the bill / invoice. In case there is change in the Registration status of the Contractor during the execution of the contract the same should be advised immediately. Due to change in the Registration status from Composition to Registered vendor etc. RFCL will not be liable for any additional tax payments.

The Contractor shall comply with all the provisions of the GST Act / Rules /requirements like providing of tax invoices, payment of taxes to the authorities within the due dates, filing of returns within the due dates etc. to enable RFCL to take Input Tax Credit. The Contractor shall always comply with the requirements of applicable laws and provide necessary documents as prescribed under the Rules & Regulations, as applicable from time to time. In particular, if any tax credit, refund or other benefit is denied or delayed to RFCL due to any non-compliance / delayed compliance by the Contractor under the Goods & Service Tax Act (such as failure to upload the details of the sale on the GSTN portal, failure to pay GST to the Government) or due to non-furnishing or furnishing of incorrect or incomplete documents by the Contractor, the Contractor shall be liable to reimburse RFCL for all such losses and other consequences including, but not limited to the tax loss, interest and penalty.

Notwithstanding anything contained anywhere in the Agreement, in the event that the input tax credit of the GST charged by the Contractor is denied by the tax authorities to RFCL for reasons attributable to Contractor, RFCL shall be entitled to recover such amount from the Contractor by way of adjustment from the next invoice (or from any other Securities like Bank Guarantees available to RFCL). In addition to the amount of GST, RFCL shall also be entitled to recover interest at the rate prescribed under GST Act and penalty, in case any penalty is imposed by the tax authorities on RFCL.

TDS under GST, if applicable, shall be deducted from Contractor's bill at applicable rate and a certificate as per rules for tax so deducted shall be provided to the Contractor.

Note: Input credit of GST shall not be considered for evaluation purposes (i.e., for arriving at L1 Bidder).

10.3 Custom Duty:

Owner shall not provide any documents for availing concessional rate of Basic Custom duty. Bidder shall ascertain the applicable Rate of custom duty and shall be solely responsible towards applicability and correctness of such rates. The evaluation and ordering shall be carried out based on the rate of customs duty considered by the bidder. No statutory variation on the customs duty will be applicable. Prices quoted by the Bidder shall deemed to be inclusive of Basic Customs duty (as above), Custom Educational Cess (including higher educational cess) and GST as applicable on import of materials.

All demurrage, wharfage and other expenses incurred due to delayed clearance of goods, or for any other reasons, either at Indian port of entry, or at any clearing point, shall be to Contractor's account. Contractor shall be solely responsible for making all necessary arrangements for complying with all necessary formalities at the Indian port of entry.

The Contractor shall be responsible for, and shall exercise due diligence in properly classifying the goods, undertaking the payment of Custom Duties, and / or otherwise complying with all applicable laws with respect to any import of the goods. In case Owner / EIL is exposed to any penal action (interest and / or penalties) by the Custom authorities for incorrect declaration and / or valuation of goods by the Contractor, or otherwise on account of any breach of applicable law

10.4 The Contractor will be under obligation for charging correct rate of tax as prescribed under the respective tax laws. Further, the Contractor shall avail and pass on benefits of all exemptions/ concessions available under tax laws.

10.5 Statutory Variations:

No variation on account of taxes and duties, statutory or otherwise, shall be payable by RFCL to Contractor except for the following:

- i) **GST:** If after the due date of submission of last price bid and upto the contractual completion period (including extended contractual completion period for the reasons attributable to Owner or due to Force Majeure condition), any increase/decrease occurs in the applicable rate of GST, the variation in such GST shall be to RFCL's account and shall be adjusted (increase / decrease) to / from the Contractor's invoices based on the documentary evidence.

Any increase in GST after the contractual completion period (including extended contractual completion period for the reasons attributable to Owner or due to Force Majeure condition) shall be to Contractor's account. However, any decrease in the rate of GST shall be passed on to Owner.

For calculating Statutory Variations ceiling amount as declared by the Bidder as per FORM SP-2 of Schedule of Prices (SOP) shall only be considered.

Note: Statutory variations on GST (included in quoted prices) in case of imported materials from outside India in Contractor's name shall be to Contractor account.

10.6 Any new taxes, duties, cess, levies notified or imposed after the due date of submission of last /final price bid but before the contractual date of completion of work (including extended contractual completion period for the reasons attributable to Owner or due to Force Majeure condition) shall be to RFCL's Account. These shall be reimbursed against documentary evidence. However, in case of delay attributable to contractor, any new or additional taxes and duties imposed after Time for Completion, as above, shall be to Contractor's account.

10.7 The contractor will be liable to ensure to have registered with the respective tax authorities and to submit self-attested copy of such registration certificate(s) and the Contractor will be responsible for procurement of material in its own registration (GSTIN) and also to issue its own Road Permit/ E-way Bill, if applicable etc.

10.8 RFCL will prefer to deal with registered supplier of goods/ services under GST. Therefore, bidders are requested to get themselves registered under GST, if not registered yet. However, in case any unregistered bidder is submitting their bid, their prices will be loaded with applicable GST while evaluation of bid.

10.9 The benefit of any Tax exemption, concessions, rebate or any other incentives available when the Contractor or its subcontractors / vendor are performing their obligation under the Contract, shall be passed on to Owner.

10.10 It is for the Bidder to assess and ascertain the rate of above taxes & duties applicable on quoted items. It is clearly understood that Owner / EIL will not have any additional liability towards payment of above taxes & duties which are based on Bidder's wrong assessment / interpretation of applicability of said taxes & duties.

10.11 Corporate Tax Liability if any shall be to Contractor's account.

10.12 Owner shall make from Contractor's bills such tax deductions as are required as per rules and regulations in force from time to time. Cess on account of Building and other Construction Workers Welfare Rules shall be deducted as per prevailing rate (presently @ 1%) from bills of the

10.13 INCOME TAX & CORPORATE TAX

10.13.1 The Contractor shall be exclusively responsible and liable to pay all direct Taxes, including income tax, profession tax and wealth tax on any payments arising out of the Contract, whether payable in India or in any other jurisdiction.

10.13.2 For Indian Contractor

The Indian Contractor shall be responsible for ensuring compliance with all provisions of the direct tax laws of India including, but not limited to, the filing of appropriate Returns and shall promptly provide all information required by the Owner for discharging any of its responsibilities under such laws in relation to or arising out of the Contract.

Tax shall be deducted at source by Owner from all sums due to an Indian tax resident Contractor in accordance with the provisions of the Income Tax Act, as in force at the relevant point of time. Owner shall issue a Tax deduction or withholding certificate to the Contractor evidencing the Tax deducted or withheld and deposited by Owner on payments made to the Contractor to enable the Contractor to claim the credit of the Tax deducted or withheld by Owner.