

EC&I CONSTRUCTION
RISK ASSESSMENT REGISTER

OHS ACT 85/1993 · CONSTRUCTION REGULATIONS 2014 · SANS 10142 · IEC 60364 · IEC 60079

Document Number	MSE-HSE-RA-001 · Rev 01 · 2025
Principal Contractor	Meekas Star Engineering Service Limited — Projects Department
Project Name	[Insert Project Name]
Project Number	[Insert Project Number]
Client / EPCM	[Insert Client Name]
Site Location	[Insert Site Location]
Scope	EC&I Construction — MV to LV, OHL, Switchgear, MCC, Instruments, Small Power, Lighting, Earthing
Prepared By	[Name] — [Role]
Approved By	[Name] — Manager, Projects
Client Acceptance	[Name] — [Role] — [Date]
Review Frequency	Monthly or after any incident or scope change
Legal Basis	OHS Act 85/1993 · Construction Regulations 2014 · General Safety Regulations

RISK RATING MATRIX — Risk Score = Likelihood × Severity

RATING	1–3 LOW	4–7 LOW-MED	8–14 MEDIUM	15–19 HIGH	20–25 CRITICAL
LIKELIHOOD (L)	1 — Rare Almost never happens	2 — Unlikely Could happen but rarely	3 — Possible May happen occasionally	4 — Likely Will probably happen	5 — Almost Certain Expected to happen
SEVERITY (S)	1 — Negligible No injury or minimal FA	2 — Minor First aid required	3 — Moderate MTI — lost days	4 — Major LTI — serious injury	5 — Catastrophic Fatality / permanent disability

Prepared By	Reviewed By	Approved By	Client Approval
[Name] — [Role]	[EC&I Site Manager]	[Name] — Manager Projects	[Name] — [Company]
Signature: _____	Signature: _____	Signature: _____	Signature: _____
Date: _____	Date: _____	Date: _____	Date: _____

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RA-001 — CABLE LADDER & TRAY INSTALLATION

MSE-HSE-RA-001-01

RA Reference	RA-001	Document Number	MSE-HSE-RA-001-01
Activity Title	Cable Ladder & Tray Installation	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with the installation of cable ladder, cable tray, and associated supports — including setting out, support installation, and ladder/tray fixing at ground level and at height.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Setting out & marking	Falls on same level — uneven terrain, obstructions	All workers	Trips, sprains, fractures	3	2	6 LOW	Clear work area before starting, wear safety boots, maintain housekeeping	1	2	2 NEGLIGIBLE	Site Supervisor
Setting out & marking	Manual handling — heavy sections	Workers handling material	Musculoskeletal injury, back strain	3	3	9 MEDIUM	Max 25kg per person, team lifts, mechanical aids for >50kg	2	2	4 LOW	Site Supervisor
Drilling / anchoring into concrete or steelwork	Dust inhalation from concrete drilling	Workers nearby	Respiratory irritation, silicosis	3	3	9 MEDIUM	P2 dust masks, wet drilling where possible, isolate work area	2	2	4 LOW	Supervisor
Drilling / anchoring into concrete or steelwork	Eye injury from drill bits, sparks, and fragments	Drillers & nearby workers	Eye damage, possible blindness	4	4	16 HIGH	Safety glasses mandatory, face shield for overhead drilling, exclusion zone	2	3	6 LOW	Supervisor
Drilling / anchoring into concrete or steelwork	Striking concealed services (electrical, piping)	Worker drilling	Electrocution, gas release, flooding	3	5	15 HIGH	Services drawing review, cable avoidance scan (CAT) before drilling, hand probe	2	4	8 MEDIUM	EC&I Site Manager
Working at height — elevated ladder installation	Falls from height >2m	All elevated workers	Serious injury, fatality	4	5	20 CRITICAL	Full body harness + double lanyard, tested anchor points (15kN), never work alone at height, exclusion zone below	2	4	8 MEDIUM	Construction Supervisor
Working at height — elevated ladder installation	Falling objects — tools, fixings, ladder sections	Workers below	Head injury, fatality	4	4	16 HIGH	Hard hats mandatory, tool tethering, toe boards on platforms, exclusion zone signed	2	3	6 LOW	Construction Supervisor

Working at height — elevated ladder installation	Structural instability — scaffold or MEWP failure	Elevated workers	Collapse, fall, fatality	2	5	10 MEDIUM	Scaffold inspected and tagged green, MEWP with valid certificate, weight limits observed	1	5	5 LOW	Competent Inspector
Cutting ladder sections	Cuts and lacerations — angle grinder, hacksaw	Worker cutting	Lacerations, amputations	4	3	12 MEDIUM	Cut-resistant gloves, face shield, secure workpiece, correct disc type, no loose clothing	2	2	4 LOW	Supervisor
Cutting ladder sections	Fire / sparks from grinding near cables	All in area	Fire, cable damage	3	4	12 MEDIUM	Hot work permit, fire extinguisher standby, remove combustibles >3m, fire watch 30min post	2	2	4 LOW	Supervisor
Cable ladder earthing & bonding	Electric shock from inadvertent contact with live circuit	Electrician / fitter	Electrical shock, cardiac arrest	3	5	15 HIGH	Verify dead before bonding, LOTO applied, test before touch, insulated tools	2	4	8 MEDIUM	EC&I Site Manager
Final inspection	Contact with sharp edges on cut ladder	Inspector	Lacerations	3	2	6 LOW	Cut-resistant gloves, file or de-burr all cut ends, awareness	1	2	2 NEGLIGIBLE	QC Officer

WORKER ACKNOWLEDGEMENT — I confirm that I have been briefed on this risk assessment, understand the identified hazards and the controls that must be applied, and agree to work in accordance with these controls:

#	Full Name	ID Number	Trade / Role	Signature	Date
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Risk Assessment Author	Construction Supervisor	EC&I Site Manager	Section 16(2) — Approved
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Date: _____	Date: _____	Date: _____	Date: _____

RA-002 — CABLE PULLING OPERATIONS

MSE-HSE-RA-001-02

RA Reference	RA-002	Document Number	MSE-HSE-RA-001-02
Activity Title	Cable Pulling Operations	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with cable installation including cable drum handling, cable routing, mechanical and manual cable pulling through conduit, ducts, cable tray, and cable ladder.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Cable drum offloading & positioning	Crush injury — cable drum roll-away or overturning	All in area	Crush injury, fatality	4	5	20 CRITICAL	Chock drums on both sides immediately on positioning, never stand in drum path, crane/forklift with rated SWL	2	4	8 MEDIUM	Site Supervisor
Cable drum offloading & positioning	Overturning of drum spindle stand	Workers	Drum drop, crush injury	3	4	12 MEDIUM	Rated spindle stands, inspect before use, level ground, load within SWL	2	3	6 LOW	Supervisor
Mechanical cable pulling	Entanglement in cable pulling winch or capstan	Operators	Entanglement, degloving, amputation	3	5	15 HIGH	Guards on all rotating parts, loose clothing prohibited, designated operator only, e-stop tested	1	4	4 LOW	EC&I Site Manager
Mechanical cable pulling	Cable snap-back / conductor whip	All in area	Eye injury, lacerations, blunt trauma	3	4	12 MEDIUM	Clear of pull axis, face shield worn, rated pulling eyes and grips, rated swivels, max tension monitoring	2	3	6 LOW	Supervisor
Manual cable pulling	Musculoskeletal injury — repetitive pulling, awkward posture	Pulling gang	Back strain, hernia, repetitive strain	4	3	12 MEDIUM	Team pulls, rotate workers every 15min, mechanical assist where possible, trained technique	2	2	4 LOW	Supervisor
Pulling through conduit	Hand / finger trap — conduit entry or midspan guides	Workers guiding cable	Crush, lacerations	3	3	9 MEDIUM	Bell-mouth conduit entries, gloves, clear communication signals between puller and feeder	2	2	4 LOW	Supervisor
Working near energised circuits	Electric shock during cable routing near live equipment	Electricians	Shock, electrocution	3	5	15 HIGH	Confirm isolation of adjacent circuits, PTW active, test before touching any conductor	2	4	8 MEDIUM	EC&I Site Manager

Cable identification & tagging	Confusion of cable IDs leading to incorrect connection	All	Electrical fault, equipment damage, shock	3	4	12 MEDIUM	Cable tagged at both ends immediately after pulling, checked against drum schedule before moving	2	2	4 LOW	QC Officer
Outdoor cable pulling — heat exposure	Heat stress / heat stroke	All outdoor workers	Heat exhaustion, collapse	3	3	9 MEDIUM	Regular breaks, shaded rest area, min 500ml water/hr, buddy system, heat illness briefing	2	2	4 LOW	Supervisor

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Risk Assessment Author	Construction Supervisor	EC&I Site Manager	Section 16(2) — Approved
[Name]	[Name]	[Name]	[Name]
Signature: _____	Signature: _____	Signature: _____	Signature: _____
Date: _____	Date: _____	Date: _____	Date: _____

RA-003 — CABLE TERMINATIONS — LV & MV

MSE-HSE-RA-001-03

RA Reference	RA-003	Document Number	MSE-HSE-RA-001-03
Activity Title	Cable Terminations — LV & MV	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with the termination of LV and MV cables including cable preparation, glanding, ferrule crimping, termination to terminals, and MV jointing/termination kits.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Cable preparation — stripping, cutting	Cuts and lacerations from cable knife, strippers, snips	Terminator	Lacerations	4	3	12 MEDIUM	Cut-resistant gloves, cut away from body, retractable blade knives, secure cable	2	2	4 LOW	Supervisor
Verifying cable is dead	Shock from residual charge or incorrect isolation	Terminator	Electric shock, electrocution	4	5	20 CRITICAL	Test for dead using approved voltage detector. Test the tester — test circuit — test tester again. Do not rely on drawings alone	2	5	10 MEDIUM	EC&I Site Manager
LV terminations at switchboard / MCC	Arc flash from inadvertent energisation	Electrician	Arc flash burns, blindness, fatality	3	5	15 HIGH	Arc flash PPE (min 4 cal/cm ²) for LV panels, PTW, LOTO confirmed, co-worker briefed	2	4	8 MEDIUM	EC&I Site Manager
MV terminations — stress cone installation	Arc flash / HV shock during MV jointing	MV terminator	Electrocution, arc flash, fatality	3	5	15 HIGH	Qualified MV jointer only, arc flash suit (min 12 cal/cm ² for MV), gloves rated for voltage, minimum approach distance	1	5	5 LOW	EC&I Site Manager
MV terminations — stress cone installation	Chemical exposure from jointing compounds / resin	Jointer	Skin and eye irritation, sensitisation	3	3	9 MEDIUM	Chemical-resistant gloves, safety glasses, SDS on site, ventilation, no eating near chemicals	2	2	4 LOW	Supervisor
Ferrule crimping — mechanical or hydraulic tool	Hand crush injury from hydraulic crimp tool	Terminator	Crush injury	3	3	9 MEDIUM	Correct die size, inspect tool before use, no hands near jaw during operation, two-hand grip	2	2	4 LOW	Supervisor
Glanding — MV & LV cable glands	Flying debris from rotating reamer or armour cutting	Terminator	Eye injury	4	3	12 MEDIUM	Safety glasses, face shield for overhead glanding, controlled cutting	2	2	4 LOW	Supervisor

Testing post-termination — IR test	Electric shock from HV test voltage (500–5000VDC)	Tester & bystanders	Shock, cardiac arrest	3	5	15 HIGH	Warning posted, area cleared before HV applied, rated test leads, HV insulated gloves, one person on tester, another on warning	2	4	8 MEDIUM	EC&I Site Manager
Testing post-termination — IR test	Inadvertent discharge of charged capacitance post-test	Tester	Shock	3	4	12 MEDIUM	Discharge cable to earth after each test, verified with meter before touching, earth left on between tests	2	3	6 LOW	EC&I Site Manager
Working in confined panel space	Heat stress from working inside energised panel room	Worker	Heat exhaustion, fainting	3	3	9 MEDIUM	Air conditioning or forced ventilation in panel rooms, break schedule, buddy system	2	2	4 LOW	Supervisor

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Risk Assessment Author	Construction Supervisor	EC&I Site Manager	Section 16(2) — Approved
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Signature: _____	Signature: _____	Signature: _____	Signature: _____
Date: _____	Date: _____	Date: _____	Date: _____

RA-004 — MV & LV SWITCHGEAR INSTALLATION

MSE-HSE-RA-001-04

RA Reference	RA-004	Document Number	MSE-HSE-RA-001-04
Activity Title	MV & LV Switchgear Installation	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with the installation, alignment, internal wiring verification, and pre-energisation testing of MV and LV switchboards, ring main units (RMUs), and associated switchgear equipment.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Unloading and positioning switchgear	Crane or forklift use — panel drop, overturn	All in area	Crush, fatality	3	5	15 HIGH	Lifting plan, rated lifting lugs, SWL observed, banksman, exclusion zone during lift, level surface	2	4	8 MEDIUM	Site Supervisor
Unloading and positioning switchgear	Mechanical handling on skates/rollers — runaway	Workers	Crush injury	3	4	12 MEDIUM	Chock at each move, controlled slope gradient, spotters on both sides, tag lines	2	3	6 LOW	Supervisor
Physical installation — bolting down	Struck by — shifting panel on uneven floor	Workers stabilising	Crush, trapped fingers	3	3	9 MEDIUM	Panel braced until permanently fixed, hand positions clear before lowering, co-workers clear	2	2	4 LOW	Supervisor
Internal wiring & connection verification	Contact with residual stored energy (capacitors, VT secondaries)	Electrician	Shock, burns	3	4	12 MEDIUM	Discharge capacitors before contact, block VT secondaries, LOTO on all energy sources	2	3	6 LOW	EC&I Site Manager
Energisation of MV switchgear	Arc flash during first energisation	Electrician / commissioning engineer	Arc flash, burns, fatality	3	5	15 HIGH	Arc flash study completed, correct PPE (cal/cm²), remote racking where possible, all non-essential clear, commissioning procedure followed	1	5	5 LOW	EC&I Site Manager
Energisation of MV switchgear	SF ₆ gas leak (where applicable)	All in area	Asphyxiation, environmental	2	4	8 MEDIUM	Gas detection equipment, trained operators, gas recovery system, ventilation, no naked flames	1	4	4 LOW	EC&I Site Manager
Operation of VCB /	Incorrect operation	Operator	Arc flash,	3	5	15 HIGH	Written switching schedule, independent	2	4	8 MEDIUM	EC&I Site Manager

ACB breakers	sequence leading to fault		equipment damage				verification, one person per breaker, communication protocol				
Working in energised switchroom	Inadvertent contact with live busbars	All in switchroom	Electrocution, arc flash	2	5	10 MEDIUM	Full arc flash PPE in energised rooms, minimum approach distance maintained, no tools left on live parts	1	5	5 LOW	EC&I Site Manager
Temporary power connections for commissioning	Incorrect polarity / phase sequence	Electrician	Equipment damage, short circuit	3	3	9 MEDIUM	Phase sequence test before connection, colour coding verified, continuity check	2	2	4 LOW	EC&I Site Manager

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Risk Assessment Author	Construction Supervisor	EC&I Site Manager	Section 16(2) — Approved
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Signature: _____	Signature: _____	Signature: _____	Signature: _____
Date: _____	Date: _____	Date: _____	Date: _____

RA-005 — 33KV OVERHEAD LINE (OHL) — STRINGING & TERMINATION

MSE-HSE-RA-001-05

RA Reference	RA-005	Document Number	MSE-HSE-RA-001-05
Activity Title	33kV Overhead Line (OHL) — Stringing & Termination	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with the erection of 33kV OHL structures, conductor stringing, insulator installation, and conductor terminations. This is a HIGH RISK activity — qualified OHL team only.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Structure erection — concrete/steel poles	Structural collapse during erection	All in area	Crush, fatality	3	5	15 HIGH	Engineered erection procedure, crane rated for load, exclusion zone 1.5× pole height, trained riggers	2	5	10 MEDIUM	Construction Supervisor
Structure erection — concrete/steel poles	Falls from structure during climbing	Climbers	Serious injury, fatality	4	5	20 CRITICAL	Full body harness, double lanyard, certified climbing equipment, dedicated safety officer present	2	5	10 MEDIUM	Construction Supervisor
Conductor stringing	Contact with existing energised conductors / lines	All on site	Electrocution, fatality	3	5	15 HIGH	Minimum approach distance enforced, crossing structures earthed, safe crossing procedures, spotter at all times	1	5	5 LOW	EC&I Site Manager
Conductor stringing	Conductor snap-back / whip — drum runaway or brake failure	All in stringing zone	Serious injury, fatality	3	5	15 HIGH	Rated braking systems, inspected before use, no persons in conductor path, tag lines, communication protocol per tower	1	5	5 LOW	EC&I Site Manager
Conductor stringing	Falling hardware — insulators, conductor, clamps	Ground workers	Head injury, fatality	4	4	16 HIGH	Hard hats mandatory, exclusion zone under stringing, never stand below workers at height	2	3	6 LOW	Supervisor
Insulator and hardware installation	Falls from height — at tower crossarm level	Climbers	Serious injury, fatality	4	5	20 CRITICAL	Full body harness, 100% tie-off, work at one attachment point at a time, no simultaneous climbers on same structure	2	4	8 MEDIUM	Construction Supervisor
Conductor termination at towers	Electrical contact — conductor not isolated / earthed	Terminator	Electrocution, fatality	3	5	15 HIGH	Earth all conductors before touching — both sides of the working section, verify with approved detector	1	5	5 LOW	EC&I Site Manager

Ground-level activities — vehicle interaction	Struck by construction vehicles	Ground workers	Serious injury, fatality	3	4	12 MEDIUM	Traffic management plan, flagmen, 20km/h speed limit, hi-vis mandatory, pedestrian exclusion from vehicle lanes	2	3	6 LOW	Supervisor
Energisation	Incorrect phase sequence or missing earth removed	All near line	Fault, electrocution	2	5	10 MEDIUM	Written energisation checklist, independent check, Docc of all earths, all persons clear before energisation command	1	5	5 LOW	EC&I Site Manager

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Risk Assessment Author	Construction Supervisor	EC&I Site Manager	Section 16(2) — Approved
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Date: _____	Date: _____	Date: _____	Date: _____

RA-006 — MOTOR CONTROL CENTRE (MCC) INSTALLATION & COMMISSIONING

MSE-HSE-RA-001-06

RA Reference	RA-006	Document Number	MSE-HSE-RA-001-06
Activity Title	Motor Control Centre (MCC) Installation & Commissioning	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with the physical installation, internal wiring verification, and commissioning of Motor Control Centres including star-delta starters, VSD drives, and direct-on-line starters.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
MCC offloading & positioning	Mechanical handling — crane, forklift	All in area	Crush, structural damage	3	4	12 MEDIUM	Lifting plan, rated lifting points, banksman, level floor, exclusion zone during lift	2	3	6 LOW	Supervisor
Mechanical fixing and levelling	Struck by — shifting MCC on uneven surface	Workers	Crush injury	3	3	9 MEDIUM	Braced until permanently fixed, hand positions clear before levelling, wedges inspected	2	2	4 LOW	Supervisor
Internal wiring verification	Contact with stored energy in capacitors (VSD)	Electrician	Shock, burns	4	4	16 HIGH	Wait full discharge time (per VSD manufacturer — typically 5min+), verify with meter, LOTO maintained	2	3	6 LOW	EC&I Site Manager
VSD parameter programming	Incorrect parameter causing uncontrolled motor start	Commissioning engineer	Equipment damage, personnel injury from unexpected movement	3	4	12 MEDIUM	Mechanical brake applied during parameterisation, area around driven equipment cleared, emergency stop tested first	2	3	6 LOW	EC&I Site Manager
Point-to-point wiring check	Incorrect wiring causing phase fault	Electrician	Short circuit, arc flash, fire	3	4	12 MEDIUM	Systematic P2P from drawings, independent verification, correct ferrule labelling, torque to spec	2	3	6 LOW	EC&I Site Manager
First motor run — star-delta or DOL	Unexpected motor rotation — wrong direction	All near motor	Mechanical damage, injury to maintenance personnel near coupling	3	3	9 MEDIUM	Decouple motor before first run, verify rotation before coupling, exclusion zone at motor end	2	2	4 LOW	EC&I Site Manager
First motor run —	VSD fault —	Electrician /	Arc flash,	3	4	12 MEDIUM	Remote operation first run, arc flash PPE,	2	3	6 LOW	EC&I Site Manager

VSD	overcurrent, earth fault	commissioning	equipment damage				fuses correct rating, protection settings verified				
Commissioning under load	Thermal overload leading to fire	All in area	Fire, equipment damage	2	3	6 LOW	Overload settings verified before load test, thermal imaging on first load run, fire extinguisher standby	1	3	3 NEGLIGIBLE	EC&I Site Manager
Working in energised MCC	Inadvertent contact with live busbars during commissioning	Electrician	Electrocution, arc flash	3	5	15 HIGH	Full arc flash PPE in live MCC, minimum approach distance, tools insulated, no unsupervised live work	2	4	8 MEDIUM	EC&I Site Manager

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Risk Assessment Author	Construction Supervisor	EC&I Site Manager	Section 16(2) — Approved
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Signature: _____	Signature: _____	Signature: _____	Signature: _____
Date: _____	Date: _____	Date: _____	Date: _____

RA-007 — INSTRUMENT & FIELD DEVICE INSTALLATION

MSE-HSE-RA-001-07

RA Reference	RA-007	Document Number	MSE-HSE-RA-001-07
Activity Title	Instrument & Field Device Installation	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with the installation of field instrumentation including transmitters, control valves, solenoid valves, actuators, junction boxes, and associated impulse tubing and signal cabling.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Installation at height — on vessels, structures	Falls from height	Workers	Serious injury, fatality	4	5	20 CRITICAL	Full body harness, double lanyard, work platform, MEWP where practical, exclusion zone below	2	4	8 MEDIUM	Supervisor
Installation in process areas	Exposure to hazardous process fluids / gases	All in process area	Chemical burns, inhalation, poisoning	3	4	12 MEDIUM	Identify process hazards before entry, ATEX rated tools in hazardous areas, SDS on file, buddy system	2	3	6 LOW	Supervisor
Installation in ATEX / hazardous areas	Spark ignition from non-ATEX tools or equipment	All in zone	Fire, explosion, fatality	3	5	15 HIGH	Only ATEX rated tools in classified zones, no mobile phones in Zone 0/1, verify zone classification before entry	1	5	5 LOW	EC&I Site Manager
Impulse tubing installation	Burns from process fluid contact during impulse connection	Instrument tech	Chemical burns, scalds	3	4	12 MEDIUM	Verify process isolation, bleed pressure before breaking containment, face shield, chemical gloves	2	3	6 LOW	Supervisor
Junction box installation & wiring	Shock from signal cables incorrectly assumed dead	Instrument tech	Shock	3	3	9 MEDIUM	Verify all field cables dead, LOTO, test before touch — instrument signals can still carry dangerous voltage in some configurations	2	2	4 LOW	EC&I Site Manager
Control valve installation	Pinch / crush from actuator movement	Workers	Crushed fingers, hands	3	4	12 MEDIUM	Isolate instrument air before work, vent actuator fully, do not place hands inside actuator housing	2	3	6 LOW	Supervisor
Working in confined spaces (vessels)	Oxygen deficiency / toxic atmosphere	All in confined space	Asphyxiation, poisoning, fatality	2	5	10 MEDIUM	Gas test before entry, continuous monitoring, rescue team on standby, no lone working in CS	1	5	5 LOW	EC&I Site Manager

Hand tools — drilling, cutting	Cuts, eye injuries	Instrument tech	Lacerations, eye damage	4	3	12 MEDIUM	Safety glasses, cut-resistant gloves, tool inspected before use	2	2	4 LOW	Supervisor
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WORKER ACKNOWLEDGEMENT — I confirm that I have been briefed on this risk assessment, understand the identified hazards and the controls that must be applied, and agree to work in accordance with these controls:

#	Full Name	ID Number	Trade / Role	Signature	Date
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Risk Assessment Author	Construction Supervisor	EC&I Site Manager	Section 16(2) — Approved
[Name]	[Name]	[Name]	[Name]
Signature: _____	Signature: _____	Signature: _____	Signature: _____
Date: _____	Date: _____	Date: _____	Date: _____

RA-008 — EARTHING, BONDING & EARTHING MAT / GRID INSTALLATION

MSE-HSE-RA-001-08

RA Reference	RA-008	Document Number	MSE-HSE-RA-001-08
Activity Title	Earthing, Bonding & Earthing Mat / Grid Installation	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with the installation of earthing systems including earth pits, earth rods, copper tape/conductor, earthing mats, and earth grid network — including associated excavation work.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Excavation for earth grid — trenching	Excavation collapse / burial	Workers in/near excavation	Burial, suffocation, fatality	3	5	15 HIGH	Shoring for depths >1m, no entry without daily inspection, battering or benching, exclusion zone	2	4	8 MEDIUM	Construction Supervisor
Excavation for earth grid — trenching	Striking underground services	Worker excavating	Electrocution, gas explosion, flooding	3	5	15 HIGH	Services drawings reviewed, CAT scan before excavation, hand dig within 500mm of services	2	4	8 MEDIUM	EC&I Site Manager
Excavation for earth grid — trenching	Falls into open excavation	Workers near edge	Fractures, head injury	4	3	12 MEDIUM	Barriers and signage around all open excavations, lighting if working after dark, covers when unattended	2	2	4 LOW	Supervisor
Excavation for earth grid — trenching	Plant / vehicle overrun into excavation	All near excavation	Excavation collapse, fatality	3	5	15 HIGH	Exclusion zone 1m from edge for plant, spotter/banksman, barriers, adequate lighting	2	4	8 MEDIUM	Supervisor
Earth rod installation — driving	Flying debris from rod driver	Workers	Eye injury, lacerations	3	3	9 MEDIUM	Safety glasses, face shield, correct driver for rod size, inspection of rod driver before use	2	2	4 LOW	Supervisor
Earth conductor installation — copper tape	Manual handling — heavy copper rolls	Workers	Musculoskeletal strain	3	2	6 LOW	Mechanical dispensers for heavy rolls, team handling, trolleys	2	1	2 NEGLIGIBLE	Supervisor
Thermite / exothermic welding of connections	Burns from molten metal splash	Workers	Burns to skin and eyes	4	4	16 HIGH	Face shield, leather gloves, fire-resistant clothing, dry conditions only, training required for thermite welding	2	3	6 LOW	Supervisor

Thermite / exothermic welding of connections	Fire from thermite weld in dry vegetation or combustibles	All in area	Fire	3	4	12 MEDIUM	Hot work permit, clear combustibles 3m, fire extinguisher standby, fire watch 30min post-weld	2	3	6 LOW	Supervisor
Earth resistance testing — clamp or fall-of-potential	Electric shock from test equipment	Tester	Shock	2	3	6 LOW	Insulated test leads, rated test equipment, verify adjacent circuits de-energised during HV injection tests	1	2	2 NEGLIGIBLE	EC&I Site Manager
Backfilling earth trenches	Striking buried conductor with compaction equipment	Workers	Damage to earth grid, shock risk	3	3	9 MEDIUM	Mark conductor depth on trench, hand compact first 300mm over conductor, inspect before mechanical compaction	2	2	4 LOW	Supervisor

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Risk Assessment Author	Construction Supervisor	EC&I Site Manager	Section 16(2) — Approved
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Signature: _____	Signature: _____	Signature: _____	Signature: _____
Date: _____	Date: _____	Date: _____	Date: _____

RA-009 — SMALL POWER & LIGHTING INSTALLATION

MSE-HSE-RA-001-09

RA Reference	RA-009	Document Number	MSE-HSE-RA-001-09
Activity Title	Small Power & Lighting Installation	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with the installation of small power distribution boards, socket outlets, surface wiring, conduit systems, lighting fixtures, emergency lighting, and final circuit connections.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Distribution board installation — fixing and mounting	Falls from ladders / steps	Worker on ladder	Fractures, head injury	4	3	12 MEDIUM	Step ladder on firm level surface, 3-point contact, do not over-reach, spotter on ladder	2	2	4 LOW	Supervisor
Distribution board installation — fixing and mounting	Heavy panel lift — musculoskeletal	Worker	Back strain	3	3	9 MEDIUM	Two-person lift for panels >15kg, mechanical aids for heavier panels, lift below shoulder height	2	2	4 LOW	Supervisor
Conduit installation — threading, bending	Cuts and eye injuries — conduit bender, die, swarf	Worker	Lacerations, eye injury	4	3	12 MEDIUM	Safety glasses, cut-resistant gloves, inspect conduit dies before use, deburr all cut ends	2	2	4 LOW	Supervisor
Wiring circuits and connections	Electric shock from live circuits	Electrician	Shock, electrocution	3	5	15 HIGH	LOTO on all circuits, verify dead on all conductors, test before touch — upstream and downstream	2	4	8 MEDIUM	EC&I Site Manager
Luminaire installation — overhead	Falls from height	Worker	Serious injury	4	4	16 HIGH	Correct ladder or work platform for height, harness if >2m, spotter, tool bag for tools	2	3	6 LOW	Supervisor
Luminaire installation — overhead	Falling luminaire during installation	Workers below	Head injury	4	4	16 HIGH	Exclusion zone below, safety wire on all luminaires, locking mechanisms verified before releasing	2	3	6 LOW	Supervisor
Emergency lighting — battery testing	Battery acid exposure	Electrician	Chemical burns to skin and eyes	2	3	6 LOW	Insulated gloves, safety glasses, ventilation in battery room, no sparks near batteries, SDS available	1	2	2 NEGLIGIBLE	Supervisor

Circuit testing — loop impedance / RCD test	Shock from test instruments on live circuits	Tester	Shock	3	4	12 MEDIUM	Rated test instruments (CAT III/IV), insulated probes, one hand rule, safety glasses, check test lead integrity	2	3	6 LOW	EC&I Site Manager
Working near other active trades	Struck by or contact with other trade activities	All workers	Various injuries	3	3	9 MEDIUM	Toolbox talk daily, demarcation of work zones, communication between supervisors of all trades	2	2	4 LOW	Supervisor

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Date: _____	Date: _____	Date: _____	Date: _____

RA-010 — PRE-COMMISSIONING, LOOP TESTING & ENERGISATION

MSE-HSE-RA-001-10

RA Reference	RA-010	Document Number	MSE-HSE-RA-001-10
Activity Title	Pre-Commissioning, Loop Testing & Energisation	Revision	Rev 01 · 2025
Prepared By	[Name] — [Role]	Approved By	[Name] — Manager, Projects
Project	[Project Name]	Site Location	[Site Location]
Date Prepared	[DD/MM/YYYY]	Review Date	[DD/MM/YYYY or after incident]
Supervisor in Charge	[Name]	Client H&S Accepted By	[Name] — [Date]

ACTIVITY DESCRIPTION:

All activities associated with pre-commissioning checks, loop testing (4–20mA verification), HV proof testing, system energisation, and formal sign-off of electrical and instrumentation systems.

HIERARCHY OF CONTROLS APPLIED: 1. Elimination → 2. Substitution → 3. Engineering Controls → 4. Administrative Controls → 5. PPE

Task Step / Activity	Identified Hazard	Who is at Risk	Potential Injury / Incident	L	S	Initial Risk Rating	Controls & Preventive Measures to be Applied	R-L	R-S	Residual Risk Rating	Responsible Person
Loop testing — 4–20mA signal injection	Incorrect injection causing unexpected equipment movement (control valves, actuators)	All in field	Equipment damage, personnel injury	3	4	12 MEDIUM	Inhibit associated control outputs before loop testing, field confirmed clear, communication with DCS operator	2	3	6 LOW	EC&I Site Manager
Loop testing — 4–20mA signal injection	Contact with signal wiring assumed dead but with hazardous voltage	Instrument tech	Shock	3	3	9 MEDIUM	Verify voltage level on all signal cables before touching, never assume safe	2	2	4 LOW	EC&I Site Manager
HV insulation resistance testing — MV cables	Shock from 5kVDC test voltage applied to cables	Tester, bystanders	Electrocution, cardiac arrest	3	5	15 HIGH	Warning posted, exclusion zone, rated HV test equipment, insulated gloves, two-person test — one at tester, one at remote end	1	5	5 LOW	EC&I Site Manager
HV insulation resistance testing — MV cables	Residual capacitive charge remaining after test	Tester	Shock	4	4	16 HIGH	Discharge to earth after every test, verify with meter, earth clips left on between moves	2	3	6 LOW	EC&I Site Manager
First energisation — LV systems	Arc flash from first energisation	Electrician / commissioning	Burns, fatality	3	5	15 HIGH	Arc flash PPE (NFPA 70E rated), remote racking where available, all non-essential personnel cleared, commissioning dossier signed	2	4	8 MEDIUM	EC&I Site Manager
First energisation — MV systems	Arc flash, structural damage from MV fault	All in switchroom	Burns, fatality	2	5	10 MEDIUM	Arc flash study reviewed, minimum cal/cm² PPE confirmed, energisation procedure signed off by client, all persons 10m clear	1	5	5 LOW	EC&I Site Manager

							minimum				
Instrument calibration with live process signals	Unexpected process condition during calibration	Instrument tech	Process upset, equipment damage, injury	3	3	9 MEDIUM	Inhibit signals, inform control room before calibration, two-person team, communication throughout	2	2	4 LOW	EC&I Site Manager
Motor runs under load	Unexpected mechanical failure — coupling, shaft, blade	All in motor area	Flying debris, injury	3	4	12 MEDIUM	Exclusion zone at motor drive end, coupling guards in place before run, thermal monitoring during run	2	3	6 LOW	EC&I Site Manager
Punch list closeout — final checks	Complacency during late-stage work — fatigue	All workers	All hazard types elevated	3	3	9 MEDIUM	Toolbox talk to address late-stage complacency, no reduction in PPE or permit discipline at any stage	2	2	4 LOW	Supervisor

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Signature: _____	Signature: _____	Signature: _____	Signature: _____
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