KAYAM	SITE OPERATIONS RISK ASSESSMENT	Part 5
	Project Hazard Assessment Form	

This pro-forma is to be completed during the planning stage of any project, from this, the site-specific risk assessment will be generated in accordance with The Management of Health and Safety at work Regulations 1999

Project Risk Assessment Summary

Note, the project risk assessment is not complete unless accompanied by this form

Project and project number				**Client**	
Site location		**Previous experience of site Y/N?**		**Kayam Tentmaster**	
Project dates				**Version number**	
Site visit required Y/N?				**Site visit completed/by**	
Outline of proposed structures *Summary of what is proposed*					
Any special hazards not covered by Kayam assessments Y/N?				**Details of special hazards**	
Assessment completed by				**Date completed**	
Review date (if required)				**Date completed**	

Hazard list – *select the hazards associated with the project from the list below*

Hazard	Applicable	Hazard	Applicable	Hazard	Applicable
Delivery of Equipment		**Installation of Structure**		**Special Hazards**	
Working with vehicles	x	Structural failure caused by weather	x	Working near or on water	
Unloading vehicles	x	Structural failure caused by production overloading	x	Working near overhead power lines	
Use of plant - General	x	Failure of lifting motors/tirfers	x	Working in politically unstable areas	
Movement of Equipment		Manual Installation of Stakes	x	Presence of pyrotechnics or fire effects in structure	
Manually transporting equipment from Point of Delivery to Point of Installation	x	Checking Roof Tension and Fixings Installation of Caps	x		
Use of FLT, Tele, Side- loader	x				
Loading/unloading of stillages	x				
Working at Height					
Use of ladders	x	**General Site Risks**		**Other Hazards**	
Use of powered access	x	Environmental factors	x	Lone Working	x
Roof work & Climbing masts	x	Use of hand tools	x	Overnight Working	x
Use of non-integrated work platforms	x	Fire	x	Site Recce	x
Use of Mobile scaffold towers		Working without gloves	x		
		Lack of first aid facilities	x		
Installation of Structure		Use of power tools	x		
Marking out structure for installation of anchor stakes	x	Crew Camping	x		
Using plant with/without pecker attachment	x	Noise	**x**		
Installation of King poles	x				
Assembly of Bale-rings	x				
Assembly of roof membrane to bale-ring	x				
Lifting of bellring and roof membrane	x				
Final installation of side poles, tensioning wires	x				

Risk Calculation and Control Measures

This risk assessment is based on a quantitive model; the risk of harm is assessed against the likelihood of that harm happening and the risk is given a score; control measures are then listed and the residual risk (i.e., that remaining following the implementation of control measures) is also scored on the same basis.

This quantitive system has the advantage over subjective qualitative assessments in that it physically demonstrates the reduction of risk to acceptable levels by a measurable factor.

The methods used for quantifying risk are explained below; risk is assessed on the basis of statistics, inbuilt safety factors, experience, control measures and best practice within the fields of theatrical production and special effects.

Control measures are summarised later in this document and are the basis for the Standard Operating Procedures

Risk Assessment Explanatory Notes

Severity Indices

1. Minor Injury = abrasions, bruising, minor burns (reddening of the skin).
2. Significant Injury = Lacerations leading to blood loss, secondary burns (leading to blistering), sprains & strains, muscle & ligament injury, minor head injuries, acute representations of underlying conditions e.g., asthma, epilepsy, bronchitic illness, diabetes, hyper/hypothermia.
3. Serious Injury = Fractures, trauma leading to significant blood loss, head injuries leading to periods of unconsciousness, acute representations of underlying conditions such as angina.
4. Major Injury = Multiple fractures, spinal or cervical injury, multiple traumas, injury affecting respiratory system, head injuries leading to significant periods of unconsciousness, myocardial infarction, status epilepticus/asthmaticus.
5. Major Incident/Fatality = Single or multiple fatality or large numbers of injuries in cat 3-4.

Severity x Probability Values

Severity		Probability	
1	Minor Injury	1	Unlikely
2	Significant Injury	2	Possible
3	Serious Injury	3	Highly Possible
4	Major Injury	4	Probable
5	Major incident/Fatality	5	Certainty

The severity and probability rating associated with each individual hazard, is calculated before the controls are put into place. Once the controls are in place, the hazard and its severity may not change however, the probability shall be reduced to ensure the residual risk does not exceed acceptable levels.

Severity x Probability	1	2	3	4	5
1		2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

2-8 Acceptable Risk 9-12 Risk Acceptable with Adequate Control Measures 15-25 Unacceptable

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Site Recce	Unknown hazards	Kayam crew Freelancers	5	3	15	• Site hazards should be ascertained in advance where possible • Client should provide suitable pre-construction information • Where hazards are communicated, suitable PPE should be used • When travelling to remote locations, notification should be left with 3rd party • Any new hazards should be noted, and suitable control measures applied	5	1	5	MD PM
Lone Working	Assault Accidental injury Falls Unable to request assistance	Kayam crew Freelancers Sub-contractors	5	3	15	• Lone working to be avoided where possible • No lone working in remote locations or crowds • Arrangements for maintaining contact with lone workers • Procedure in place for lone workers who do not check in	5	1	5	MD
Delivery of Equipment	Working with vehicles	Kayam crew Local crew Other workers in area	4	3	12	• Drivers to follow site traffic instructions • Care to be taken when reversing – use banksman • Crew working around vehicles to wear hi-vis vest or jacket • Unloading only to be carried out in designated areas • Unloaded equipment to be moved from delivery point as soon as possible • Unloading areas to be suitably lit	4	2	8	CB Kayam crew
Delivery of Equipment	Unloading vehicles: Manual handling injuries Slips, trips and falls Crushing or collision with plant	Kayam crew Local crew Other workers in area	 3 3 5	 4 4 4	 12 12 20	• Unloading only to be carried out in designated areas • Unloading areas to be suitably lit • FLT unloading to be managed to maintain weight distribution • Heavy loads to be marked • Only competent FLT ops to be used • Access to pedestrians to be restricted in FLT working areas • FLT/Tele operator to be guided in areas of impaired visibility • Use of PPE: gloves, boots, Hi-vis, helmet • Loads requiring 2 pax lift suitably marked • Issues with unloading area lighting or surface to be immediately reported to PM	 3 3 5	 2 2 1	 6 6 5	CB Kayam crew

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Use of plant General	Collision Falls Unstable loads	Kayam crew Local crew Other workers	4 4 4	4 4 4	16 16 16	• All plant users must be competent have evidence of suitable training • Client to confirm suitable plant routes and any exclusion areas • Operators to complete daily checks at beginning of shift • Any deficiencies to be reported to PM • Operator to ensure they are familiar with machine/model before beginning work • Operator to ensure sufficient fuel for tasks • All plant to be used within indicated SWL • Operators to ensure that they work within the capacity of the machine • Operators to be aware of any relevant safety or rescue procedures • Only authorised accessories to be used on client supplied plant • Suspended loads only to be carried with correct attachment • Signallers and banksmen to be used as required • Forks and Teles to be parked with the forks grounded • When moving MEWPS, the platform must be lowered and face the direction of travel • Mobile phones not to be used while operating plant • Operators should ensure that controls do not become compromised by equipment • Operators to be aware of overhead hazards	4 4 4	2 2 2	8 8 8	CB Kayam crew Plant operator Client Site manager

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Movement of Equipment (Manual)	Manually transporting equipment from PoD to PoI: Manual handling injuries Slips, trips and falls Obstruction of thoroughfares and escape routes	Kayam crew Local crew	3 3 5	4 4 4	12 12 20	• Pallet truck/ trolley to be used for transfer inside stadium to closest access point • Heavy loads to be marked • Where possible, some components will be fitted with wheels • Boxes and cases to be suitable for carrying and manual handling • Use of PPE as appropriate • Loads requiring 2 pax lift suitably marked • Lifting aids to be used where identified • Long loads to be carried front and rear • 2 people to be used to carry loads above 15kg • Ramps to be used where available –Kayam to supply ramps where identified in recce • Route from point of delivery to point of installation to be checked and free from obstructions • Equipment to be placed at point of Installation so as not to cause an obstruction or impede emergency exits • Fire doors not to be wedged or held open	3 3 5	2 2 1	6 6 5	CB Kayam crew Client site manager

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Movement of Equipment Use of FLT, Telehandler	Collision Crush injuries Unstable loads Trapping & pinching	Kayam crew Freelance staff Local crew Other workers	5 5 4 3	3 4 4 4	15 20 16 12	• Plant to use designated routes • Pedestrians to be kept clear • Only suitably competent operators to use plant for which they are trained • Plant operators to complete daily checks • Site rules and speed limits to be followed • Correct stillages for storage of materials & articles • All stillages to placed safely • Loads only to be landed in clear areas • Operators to ensure loads are within plant capability • Loads to be checked for stability if being moved across rough or uneven ground • Loads to be strapped if necessary • Stillages not to be stacked so as to obscure operators view • All crew working with FLTs to use PPE, Helmets, Hi-vis, steel cap boots • Crew directing boomed loads not to stand between load and landing point • No passengers to be carried if suitable seats no fitted • Plant operators not to use mobile phone whilst operating • Crew to use gloves when guiding stillages and keep hands away from contact points	5 5 4 3	1 1 1 2	5 5 4 6	CB Kayam crew Client site manager
Movement of Equipment Loading/unloading of stillages	Trapping and pinching Manual handling injuries	Kayam crew Freelance staff Local crew	3 3	4 4	12 12	• Components to be loaded/unloaded to be assessed for weight • 2 person lift components easily identifiable • Stillages to be positioned as close to point of use as possible • PPE, gloves, and steel capped boots • Stillages not to be over or unevenly loaded • Empty stillages to be stacked and stored as instructed – stillages not to be stacked more than 4 high • Kayam workers have received MH training	3 3	2 2	6 6	CB Kayam crew

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Structural Installation Marking out structure for installation of anchor stakes	Manual handling injuries Dropped components Collision Unauthorised access Damage to underground services	Kayam crew Local crew	3 3 3 4 3	4 3 3 3 3	12 9 9 12 12	• Client to advise Kayam of any underground services • Component stillages delivered close to point of use as possible • All tent stakes are 1 person lift • Base to be set out by Kayam CB • Intermediate landing boards to be installed where necessary • PPE, boots, helmet, gloves, hi-vis • Kayam crew have received training • Client site manager to install exclusion zone around structure • Kayam PM and Clients site manager to agree position of structure • Client to be informed immediately if underground services are struck	3 3 3 4 3	2 2 1 1 2	6 6 3 4 6	CB Kayam crew
Installation of anchor stakes and base plates Using plant with/without pecker attachment	Trapping and pinching points Crushing	Kayam crew Local crew	4 4	4 4	16 16	• Work area for to be kept sterile • Client to advise of presence of underground hazards • All crew to use PPE, hi-vis, boots, and gloves • Crew to keep hands clear of trapping points when stakes being driven into ground • Banksman to be used to see vehicle back. • All Plant operators to be trained and competent • Crew to ensure all hands, arms, feet are clear before stakes are hammered in by pecker	4 4	2 2	8 8	CB Kayam crew
Installation of anchor stakes and base plates Manual Installation of Stakes	Trapping and pinching points Crushing RSI	Kayam crew Local crew	4 4 4	4 4 3	16 16 12	• Client to advise of presence of underground hazards • All crew instructed how to correctly use sledgehammer for installing stakes • Crew to use PPE – gloves, eye protection and hard hat • Sledge user to maintain eye contact with stake at all times • Crew to coordinate actions so all parties are aware of activity • If rock or hardcore is struck, cease operation and try stake elsewhere	4 4 4	2 2 1	8 8 4	

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Structural Installation Installation of King poles	Unstable loads Falling objects Trapping and pinching	Kayam crew Local crew	5 4 3	4 4 4	20 16 16	• Client to provide safe working area • Exclusion zone established for lifting operations. • All crew must remain outside stake line until king poles are raised to vertical position by remote control and correctly secured • All crew to wear Hi-vis, hard hat, boots, gloves. • Guy wires are correctly connected to king poles and ground anchor stakes prior to hoisting	5 4 3	2 2 3	10 8 9	CB Kayam crew
Structural Installation Assembly of Bale-rings	Moving loads Trapping and pinching Manual handling injuries	Kayam crew Local crew	4 4 3	4 4 5	16 16 15	• All crew briefed as to sequence of construction • Ensure sufficient crew to assemble bale-ring to Kingpoles • PPE – Hard hats, hi-vis, boots, gloves where required • Crew have received manual handling training. • Most components are 1- or 2-person lift	4 4 3	2 1 2	8 4 6	CB Kayam crew
Structural Installation Assembly of roof membrane to bale-ring	Falls Overhead loads Trapping and pinching Manual handling injuries	Kayam crew Local crew	5 4 3 3	4 4 4 5	20 16 12 15	• Components to be laid out and checked before assembly • Roof membrane should be assembled from ground level • Most components are 1- or 2-person lift • Crew to use lifting aids where practical • Crew to follow sequence of assembly as directed during training • PPE – Hard hats, hi-vis, boots, gloves where required	5 4 3 3	1 2 1 2	5 8 2 6	CB Kayam crew
Structural Installation Lifting of bellring and roof membrane	Overhead Loads Failure of lifting equipment Trapping and pinching Falling objects	Kayam crew Local crew	5 5 4 4	3 3 3 4	15 15 12 16	• Tentmaster to coordinate lifts • Crew not to work/stand beneath overhead loads • Hoists to be coordinated by tentmaster • Hoists to be visually checked before use and have a current test certificate • PPE – Hard hat, boots, hi-vis, harness and gloves as required • Bale-rings are lifted simultaneously. • Side poles are attached to help secure roof membrane in position • Tightening of the ratchets and ensuring that the tent has an even pull in all directions.	5 5 4 4	1 1 1 2	5 5 4 8	CB kayam Crew

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Structural Installation Final installation of side poles, tensioning wires Ongoing maintenance	Falls Falling objects Manual handling injuries	Kayam crew Local crew	4 5 3	4 4 4	16 20 12	• All WaH to be carried out from MEWP where possible • If climbing, then full use of PPE • PPE, helmet, boot, harness, lanyard/ASAP, gloves, hi-vis, WPS • All tools to be attached by lanyards • Only one person to direct component delivery • Use ladder or stepladders • Clear area to be maintained beneath work until components fixed • Work to stop in windy/poor weather conditions • Rescue at height plan in place • Radio communications between deck and 'topside' crew	4 5 3	2 1 2	8 5 6	CB Kayam crew
Structural Installation failure Structural failure caused by weather	Structural collapse Falls Falling objects	Kayam crew Local crew Others in area	5 5 5	3 3 3	15 15 15	• All structures designed to Eurocode 1 ENV 1991-2-4:1995 and EN 13814:2004 • Anemometer to be fitted where necessary • PM or CB to check weather forecasts and wind speeds • Wind management plan advised to clients for affected structures • Stand-by crew to deal with weather related issues • Tent walls to be removed in high winds (depending on wind direction) • Client to inform Kayam of extremes of weather in intended structure location • Client to have in place contingency plan for extremes of weather • Kayam PM or CB to advise client if conditions go beyond intended design loads • Where heavy snowfall expected, Kayam will revise roof loadings • Responsibility for emergency action plan is that of client all Kayam structures checked for integrity and signed off by suitable person prior to handover	5 5 5	1 1 1	5 5 5	Client Site manager Kayam PM Kayam CB

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Structural Installation Structural failure caused by production overloading	Structural collapse Falls Falling objects	Kayam crew Local crew Others in area	5 5 5	3 3 3	15 15 15	• All structures designed for loading parameters advised by Kayam and agreed on final version of drawings • Client to inform Kayam of intended roof loads • No additional equipment to be hung unless cleared by Kayam • All Kayam structures checked for integrity and signed off by suitable person prior to handover • Responsibility for roof loading is that of client production and rigging team • Roof to be 'deaded off' once in position • Suspended equipment to be lowered in high winds • Client to inform Kayam if moving trusses	5 5 5	1 1 1	5 5 5	Client Site manager Client production manager Riggers Kayam PM Kayam CB
Structural Installation failure Failure of lifting motors/tirfers	Structural collapse Falls Falling objects	Kayam crew Local crew Others in area	5 5 5	3 3 3	15 15 15	• All motors to be checked annually, or as otherwise required • All motors to carry evidence of maintenance and testing • PM/CB to ensure sufficient motors for lift • Lifting motors should have redundancy capacity and SWL marked • Motors to be operated in unison by single controller • Failed motors to be swapped out – external lifting aids NOT TO BE USED in conjunction with motors • No lifts which are not within capability of motors to be undertaken • Lifts only to be used to position roof. Not as point of attachment	5 5 5	1 1 1	5 5 5	Kayam Rigging Kayam PM Kayam CB
Working at height Use of Ladders	Falls Displacement of ladder Falling objects	Kayam crew Local crew	4 4 3	4 4 3	16 16 9	• Ladders to only be used in accordance with INDG402 • Ladders should be checked each day • Crew must maintain 3 points of contact unless using secured ladder and safety attachment • Crew must not overreach when using ladders • Tasks using ladders must extend for no more than 30 minutes • Ladders should be Class 1 Industrial or EN 131 • Ladders should only be used on firm level ground (side >16degrees, back >6degrees) • Ladders should be secured wherever possible • Safe working zone to be created around ladder area • Maintain sterile zone beneath ladder and worker • When using ladders, avoid using top 3 steps • When using stepladders, avoid using top 2 steps unless there is a handrail • Toolbelt should be used • Crew should avoid carrying tools or equipment up ladders	4 4 3	2 2 1	8 8 3	CB Kayam crew

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Working at height Use of powered access: MEWP	Falls, tipping Falling objects	Kayam crew Local crew	4 4	4 4	16 16	• Only persons who can demonstrate competency by recognised certification permitted to operate powered access equipment or MEWPS • Client SM site to ensure all MEWP or powered access equipment is suitable, serviceable and has records of testing • Ensure ground conditions are suitable for type of MEWP • Operators and passengers to wear suitable harness and positioning or restraint lanyard • DO NOT 'tie-in' using fall arrest lanyard – restraint lanyards set to shortest length MUST be used • Do not overreach or reach out of the MEWP basket • Ensure rescue plan is in place • Ensure sterile zone around and underneath MEWP work area	4 4	2 2	8 8	CB Kayam crew
Working at height Roof work Climbing masts	Falls Falling objects	Kayam crew Local crew	4 4	4 4	16 16	• Only trained and competent crew to work at height • Usual hierarchy of controls to be considered • Any person working at height must use Prusik Knot/ASAP/double lanyard at all times if required to clip on • Tools to be attached by lanyards • PPE, harness, helmet, boots, gloves, hi-vis • Exclusion zone under WaH areas • PM to monitor weather, WaH to stop in windy or poor weather • Rescue at height plan in place • No lone working • All crew to have radio comms to PM/CB • WaH only to take place in sufficient lighting	4 4	2 1	8 4	CB Kayam crew Local crew
Working at height Checking Roof tension and Fixings Installation of Caps	Falls	Kayam crew	5	4	20	• Only experienced crew to complete this task • Crew to be competent in the selection and use of WaH PPE • Roof access should be via kingpoles and bale rings • When 'walking' the top canvas, crew should use safety line from kingpole • Crew should use appropriate footwear for this task • Tentmaster to ensure that a suitable rescue plan is in place • Tentmaster to ensure weather conditions are suitable before undertaking this task	5	2	10	

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Working at height Use of non-integrated work platforms	Falls Falling objects Tipping	Kayam crew Freelance staff Local crew	4 4 4	4 4 4	16 16 16	• Only persons who can demonstrate competency by recognised certification permitted to operate FLT • Client SM to ensure all FLT are suitable, serviceable and has records of testing. • Ensure that the man basket is suitable for the task. • Basket must be fixed to fork carriage by pins or suitable restraint • Ensure ground conditions are suitable for working. • Operators to wear suitable harness and positioning or restraint lanyard whilst in man basket. Do not overreach or reach out of the basket • Communications and signals to be agreed between workers in basket and FLT operator • FLT may not be moved while operator is in the basket • Tilt function to be deactivated where possible • Work only to be carried out for unplanned maintenance or emergency tasks. Ensure rescue plan is in place • Ensure sterile zone around and underneath work area	4 4 4	2 2 2	8 8 8	CB Kayam crew Local crew Client site manager
Working at height Use of Mobile scaffold towers	Falls Falling objects Tipping	Kayam crew Freelance staff Local crew	4 4 4	4 4 4	16 16 16	• Only mobile towers approved to EN 1004 to be used • Only trained and competent crew to erect and use mobile scaffold towers • Crew to check SWL on tower wheels • Crew building towers MUST carry out a full inspection after construction and record it • User to carry out pre-use checks each day • Wheel brakes and outriggers to be used as specified by manufacturer • Towers not to be moved with personnel on the working platform • Crew to ensure safe working area around and under tower • Crew only to use approved access methods for ascending the tower • Towers above 4m to be lowered before moving • Operators not to exceed SWL of tower • Operators to be aware of overhead hazards • Operators not to use handrails to reach out – must remain in platform. • If task requires reaching out of the platform, a harness and lanyard may be used	4 4 4	2 2 2	8 8 8	CB Kayam crew Client site manager Equipment supplier

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
General-Working on temporary sites	Collision with vehicles & plant	Kayam crew Local crew	4	3	12	• Kayam PM to get pedestrian and vehicle routes from site manager • All Kayam crew to be briefed • Crew vehicles only to be parked in designated spaces • Kayam crew to use pedestrian routes when walking around sites • Crew to wear hi-vis when in proximity to vehicles • Kayam working area to be kept free from unauthorised vehicle and pedestrian access by client SM • Crew to take extra care walking through sites in hours of darkness	4	1	4	CB Kayam crew Client site manager
General working on outdoor sites Environmental factors	Heat casualties Hypothermia & exposure Sunburn	Kayam crew Local crew	3 4 2	3 3 3	9 12 6	• Kayam, crew to be provided with suitable waterproof and foul weather clothing • Client SM to provide shelter for crew • Kayam crew to have access to drying and storage facilities • Kayam to ensure, through client, that hot and cold drinks and facilities for meals to be taken are provided • Kayam PM to consider changing working hours to avoid extremes of weather • Kayam PM to ensure sunscreen is available • Kayam PM to check that local crew have suitable equipment, redeployment if not • PM to ensure sufficient drinking water available for crew working in hot conditions	3 4 2	1 1 1	3 4 2	CB Kayam crew Client site manager
General working Use of hand tools	Impact injuries Cuts and scratches Penetrating injuries Eye injuries	Kayam crew Local crew	3 3 3 3	4 4 3 3	12 12 9 9	• All crew to be competent in use of tools before being tasked • Tools to be regularly inspected • Use of battery tools wherever possible • PPE, gloves, eye protection, coveralls where required • Tools should be used on stable surface where possible • First aid kit available	3 3 3 3	2 2 1 1	6 6 3 3	CB Kayam crew Client site manager

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
General working Fire	Burns Smoke inhalation	Kayam crew Local crew	4 5	3 3	12 15	• PM to receive fire safety briefing from client SM and to brief crew • Crew to familiarise themselves with emergency exit routes and firefighting equipment • Crew to take care during 'hot work' and obtain permit where necessary • Flammable gasses and liquids to be stored correctly and in accordance with site policy • No smoking other than in designated areas • Regular clean ups of Kayam working area to remove waste and potential fuel sources • Crew to ensure they do not obstruct or block and fire escape or emergency exit routes • Kayam structure generally presents low fire load in construction phase • Crew not to do anything to increase fire risk on site • Kayam team to co-operate with client H&S and fire safety teams • PM to advise crew of assembly point and take roll call in the event of evacuation	4 5	1 1	5 5	CB Kayam crew Client site manager Client safety team

General working
 	
Working without gloves
	Cuts and scratches
	
	Pinching
	
	Burns
	
	Dermal irritation
		Kayam crew
		
		Freelance staff
		
		Local crew
			2
			
			2
			
			3
			
			3
				4
				
				4
				
				4
				
				4
					8
					
					8
					
					12
					
					12
						• Certain tasks require delicate manipulation whereby gloves may become a hazard, the PM will permit work without gloves during certain tasks:
						  • Threading screws and bolts
						  • Centring screws
						  • Manipulating chain links and connectors
						  • Manoeuvring plant & driving
						• Barrier creams to be provided
						• Local risk assessment to be undertaken
							2
							
							2
							
							3
							
							3
								2
								
								2
								
								2
								
								2
									4
									
									4
									
									4
									
									4
										CB
										Kayam crew

General working Lack of first aid facilities	Lack of treatment to injuries Worsening of medical conditions	Kayam crew Freelance staff Local crew	4 4	4 4	16 16	• All Kayam crews should have minimum of 1 first aider • First aid kit in Kayam vehicles • PM to liaise with client SM about medical assistance on site – crew to be briefed • Crew to have information about local hospitals and doctors	4 4	1 1	4 4	CB Kayam crew Client site manager

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
General working Noise	Temporary hearing damage Permanent deafness	Kayam crew Freelance staff Local crew	2 3	3 3	6 9	• Tools to be CE marked and noise level rated where possible • Majority of Kayam work does not involve noise levels over secondary action level • Where noise levels may be over 80db, hearing protection will be provided • Where noise levels above 85db, hearing protection will be worn and signage will be posted • Client SM responsible for briefing Kayam of any excessive noise levels and for installing hearing protection zones • Kayam crew entering HPZs will use hearing protection	2 3	2 1	4 3	Kayam PM Crew Client site manager
General Working Crew Camping	Fire GI Related illness	Kayam crew	5 4	3 3	15 12	• Client to provide suitable area for crew camping with access to sanitary facilities and drinking water • Fire extinguishers to be located centrally and all crew to be briefed on site fire procedures • PM to arrange camping area with suitable breaks between tents • If campfires are permitted then crew to ensure they are extinguished or not left unattended • Suitable food preparation and hand washing facilities to be in place when crew self-cater • All food items to be suitable stored • All electrical installations to be to BS 7909 • All electrical equipment to be covered and protected from water ingress of IP 6X rated	5 4	1 2	5 8	
General Working Overnight working	Fatigue Poor lighting conditions	Kayam crew Freelance staff Local crew	4 5	3 2	12 10	• Fresh crew to be used for o/n shift where possible • Welfare facilities to be in place • Crew boss to manage working hours • Additional lighting to be installed by client • Hi-vis clothing to be worn • Overnight shifts should not last longer than 12 hours • Crew boss to ensure all crew fully briefed • Hazardous tasks to be re-assessed if to be completed overnight	4 5	2 1	8 5	Client site manager Kayam PM Crew

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
General Working Use of power tools	Cutting/penetrating injuries Eye injuries Fire Electrocution Dust or particulate inhalation	Kayam crew Freelance staff Local crew Other workers	3 3 5 4	4 4 3 3	12 12 15 12	• Only competent persons to use power tools • Battery tools to be used where possible • Tools must be regularly checked for defects • When using mains powered tools, cables must be managed • PPE, gloves, hi-vis, boots, safety glasses • Obtain permit to work if required • Position additional FFE if required • Use a flat stable surface to work on wherever possible • Tools must be returned to storage area after use • If task causes dust or creates fumes then suitable respiratory PPE to be used	3 3 5 4	1 1 1 1	3 3 5 4	Kayam PM Crew Client site manager
Use of gas tools (cutting & welding equipment)	Burns Hand injuries Arc eye Fire & explosion Fume inhalation	Kayam crew Local crew Other workers	3 3 3 5 4	4 3 5 3 4	12 9 15 15 16	• Only competent persons to use gas tools • Gas cylinders to be stored in accordance with site procedures • Suitable eye protection to be used when cutting/welding • Suitable gloves to be worn when welding/cutting • PPE, gloves, boots, hood, resp filter (if req'd), Normex coveralls, hi-vis • Additional FFE to be located at work site • Hot work permit to be obtained (if applicable) • Cutting and welding should be done in well-ventilated area • No smoking around gas cylinders • Components to be cut/welded should be suitably stabilised • 30 Minute fire watch after hot works have been completed	3 3 3 5 4	2 2 1 1 1	6 6 3 5 4	Kayam CB Crew Client site manager
Working near water	Drowning Water borne infections Hypothermia	Kayam crew Local crew	4 5 4	3 4 3	12 20 12	• Specific risk assessment to be undertaken for this task • Crew to be issued buoyancy aids if RA requires • Crews should not clip on to MEWPs where there is a risk of falling into water • Suitable PPE to be issued • Safety boat if determined by RA • Crew to be briefed on procedures if worker falls into water • Crew to have suitable communications and means of calling for assistance	4 5 4	2 1 2	8 5 4	Kayam directors Kayam PM Client site manager and Safety advisor

Activity	Hazards/Risks Identified	To Whom	Risk Rating			Control Measures	Residual Risk			Responsibility
			S	P	RR		S	P	RR	
Working near overhead power lines	Electrocution	Kayam crew Local crew	5	4	20	• Client and PM to ensure all crew are briefed as to location and power of any overhead power lines • Clint to confirm to PM any lines that have been de-energised • Crew only to use plant within accepted distances from powerlines • Crew to be aware of possibility of arcing and required safety distances • Plant operators aware of emergency actions on the case of Power line strike	5	1	5	Client Kayam PM Plant operators
Working in politically unstable areas	Political violence Kidnapping	Kayam workers	5 5	3 3	15 15	• Any work in politically unstable, or sensitive areas MUST be subject to specific security and risk assessment • Directors must decide on viability of project following security assessment • If working in these areas, Kayam workers MUST follow directions of security team • Directors to ensure crew base, transport and workplace is secure before committing staff • Workers must be briefed and trained, if necessary, in anti-ambush and general safety procedures • PM will have contingency plan for emergency evacuation of workers if required	5 5	1 1	5 5	Kayam directors Security and safety advisors Client Kayam crew
Presence of pyrotechnics or fire effects in structure	Fire & smoke Burns	Kayam crew Local crew Other workers	5 4	3 3	15 12	• Pyro operator to confirm with PM safe lift heights for effects with reference to roof height • PM to inform client if any construction materials are not fire retardant • Client to ensure additional fire safety measures are implemented • Kayam crew to remain clear of effects areas unless specifically briefed • All crew to be aware of local fire and emergency procedures	5 4	1 2	5 8	Client Kayam CB Pyro/Effect supervisor Client site team

Part 5
Method Statements

Method Statements/Safe Systems of Work

March 2025

Contents

1. **Commonly used abbreviations or technical terms**

2. **Current method statements:**

Commonly used abbreviations or technical terms

AF	A Frame
AP	Appointed Person
Kayam	Kayam crew/company
ASAP	Petzl Absorber Safety Device
BT	Big Top
BR	Bale- Ring
CB	Crew Boss
CoG	Centre of Gravity
COSHH	Control of Substances Hazardous to Health
FLT	Forklift Truck
HIAB	Lorry Loader
HSE	Health & Safety Executive
Hv	High Voltage
IPAF	International Powered Access Federation
KP	King Poles
LC	Local Crew
MEWP	Mobile Elevated Work Platform
MS	Method Statement
OHP	Overhead Power (lines)
PM	Project Manager
PPE	Personal Protective Equipment
RA	Risk Assessment
RAMS	Risk Assessment & Method Statement
RaH	Rescue at Height
SSoW	Safe System of Work
SWL	Safe Working Load
Tele	Telescopic Reach Handler
TS	Tiered seating
TDS	Temporary demountable structures
TT	Tensile Tent
WaH	Working at Height
Lanyard	Double Ended Fall Arrest or Restraint device
Zip Tower	Type of Mobile Scaffold Tower

KAYAM	Method Statement	Kayam/MS/5.1

Vehicle Unloading and Loading

Processes Involved	• Unloading of vehicles • Movement of equipment • Working at height • Use of plant including powered access	**PPE Required** **Bold – compulsory** *Italics – as required*	• **Safety boots** • **Hi-vis waistcoat** • **Hard hat** • *Harness and lanyards* • *Gloves*
Relevant Hazards and Controls	See ORA		
Other Relevant Safety Documents	Health and Safety Policy Safety Documentation Kayam/MS/5.3, 5.5, 5.6		
Relevant Guidance	INDG 402 Safe Use of Ladders INDG 413 Preventing Falls from Vehicles CPA0902 Working at Height Whilst Loading and Unloading Transport HSE L117 Rider-operated lift trucks CPA1101 Safe use of Telehandlers in Construction (second revision)		
Project Manager/Crew Boss Checks	• Client has provided safe working area • Working area is sufficiently lit • Plant available and suitable for purpose • Local crew with correct skills • All crew have suitable PPE and have undergone site induction • All crew are aware of tasks to be undertaken, and any relevant specific safe working methods and PPE required • Any required toolbox talks completed and crew aware of vehicle and lifting signals		

Introduction
Vehicle unloading and loading can often be a hazardous process, involving plant, occasionally cranes and elements of working at height as well as the usual vehicle hazards. Where vehicles are loaded by Kayam, loads will be arranged for the safest method of unloading. Normally Kayam equipment will arrive in flatbed, curtain-sider, or box trailers; and they may be unloaded by forklift, truck mount crane (HIAB), tele handler, or manually.

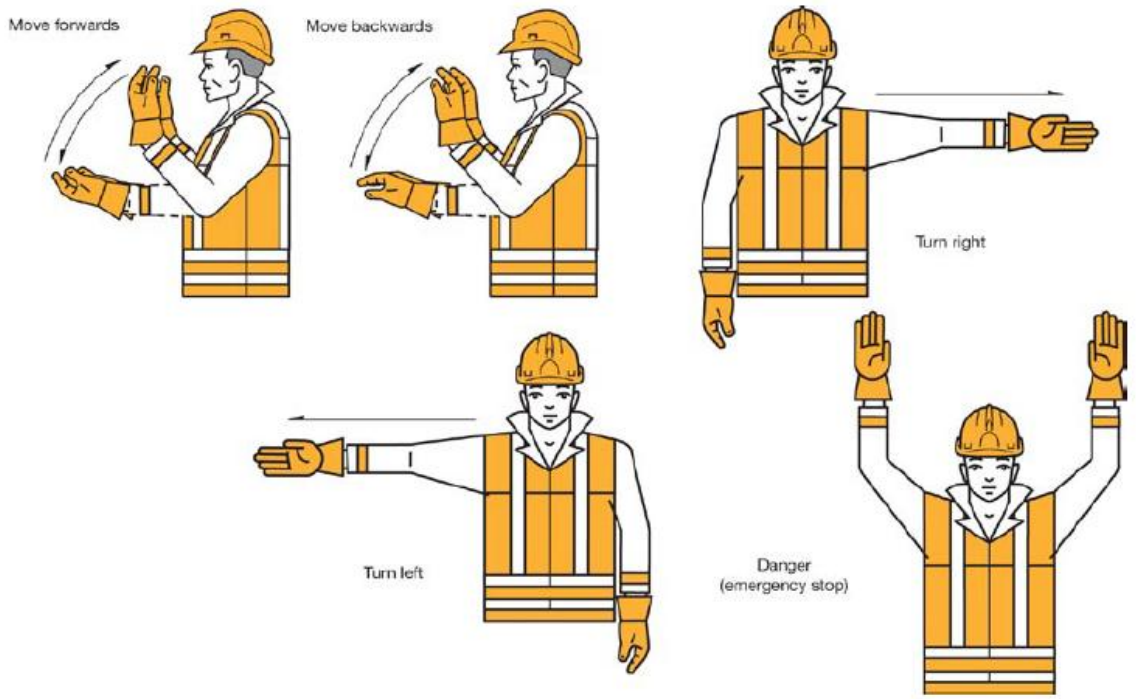


Fig VU1. Showing standard vehicle marshalling signals

Vehicle Unloading Method - Preparation
• The PM will liaise with the client to confirm that there is a suitable area in which to unload vehicles, where possible access should be restricted to Kayam personnel • The PM will confirm with the client that suitable temporary lighting is available for the operation if required • The PM will arrange the unloading sequence to pre-empt the installation sequencing to avoid double handling and loads stacking up • Trucks will be called forward in sequence, depending on the circumstances they may drop their trailers, or remain attached in the unloading area • Where trailers are being left, the driver should ensure the legs are resting on pads and secure with the trailer parking brake applied • Truck drivers should remain in their vehicles, or totally leave the area if they do not have the correct PPE

Fig VU2. Safe Un-loading using FLT

Vehicle Unloading – Forklift or Telehandler
• Once the vehicle to be unloaded is in position, any tarpaulin or sheeting should be removed. • After assessing the load, crew will release securing straps, or curtain-side clips – if there is any doubt as to the stability of the load, additional securing methods should be considered during the unloading process • Crew will call forward FLT/Tele as required to safely unload the truck – see fig VU2 • PM should ensure crew with the required skills, knowledge training and expertise are available. • Banksman to guide plant operator to position forks if required • Components will be removed in sequence, as directed, and moved to landing area or designated boneyard • Crew member to bank forks or telehandlers whilst reversing away from vehicle under load • Process to be repeated until unloading complete • The procedure for loading trucks is essentially the same in reverse; however, a banksman should ensure that fork trucks do not push the load too far across the flatbed deck • Crew will ensure that the area is clear before securing straps are thrown across the load

Vehicle Unloading – accessing the top of the load
• On occasion, it will be necessary to access the top of the load while it is still on the vehicle • Access should be by an elevated work platform if available, crew using MEWPs must follow normal plant operating procedures. • If a MEWP is unavailable, then crew members may use properly secured ladders to access the load – a ladder may only be used to access the specific point NOT to provide access to the top of the load unless fall protection measures are in place • Kayam crew are not permitted to walk along the top of loads unless there are collective or individual fall protection measures in place • It may be possible to suspend an inertia reel from a temporary access point or a crane or HIAB hook - this must be agreed with the crane/HIAB operator • If the vehicle trailer is fitted with a safety line, or the unloading area has a temporary swinging fall arrest point then these can be used in conjunction with a harness – see Fig VU3 • Crew must climb down from the top of the load or flatbed, under no circumstances should Kayam personnel jump to the ground from trailers

Fig VU3. Temporary swinging arm inertia reel

Fig VU4. Accessing trailer with ladder

KAYAM	Method Statement	Kayam/MS/5.2

Working at Height

Processes Involved	• Climbing Kingpoles • Installing scrims and banners • Remedial work to roof of membrane • Use of plant/MEWP • Use of mobile scaffold towers • Use of ladders and stepladders • Use of non-integrated work platforms	**PPE Required** **Bold – compulsory** *Italics – as required*	• *Safety boots* • **Hi-vis waistcoat** • ***Hard hat**** • **Full Harness** • **Lanyards** • **Work positioning lines** • **Fall arrest** • **Radio** • *Gloves* *Vented climbing helmets are acceptable if no electrocution or molten liquid hazard
Relevant Hazards and Controls	See ORA		
Other Relevant Safety Documents	Health and Safety Policy Safety Documentation Kayam/MS/5.4, 5.5, 5.6		
Relevant Guidance	HSG150 Health & safety in construction HSE INDG401 Working at height		
Project Manager/Crew Boss Checks	• Client has provided safe working area • No alternative other than work at height • Crew have correct PPE and know how to use it • Rescue plan in place • All crew briefed as to tasks and rescue procedure • Crew aware of any fixed safety lines or fall arrest points • Plant (if being used) is serviceable and functioning correctly • Plant operators competent • Clear area beneath work at height		

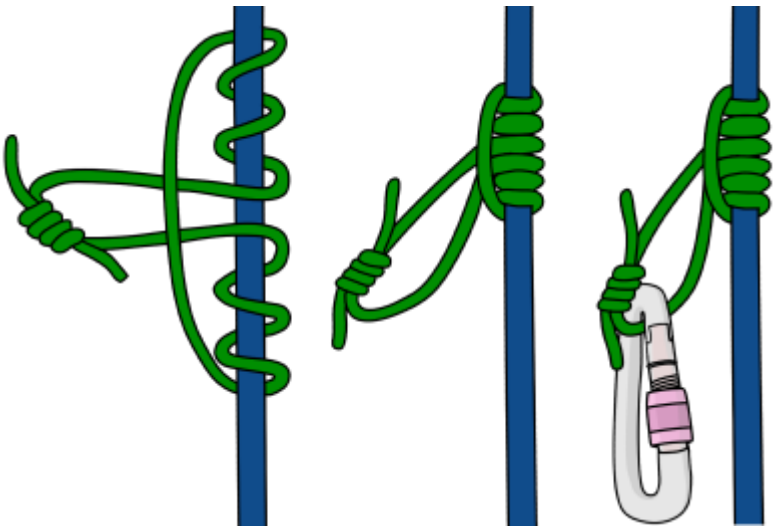
Introduction
Kayam workers may be called upon to work at height, either as part of Kingpoles installation, or any number of tasks from maintenance to final fit and finishing of structures. In accordance with the hierarchy of controls, where possible, the need for work at height will be planned out, or safe working platforms, such as MEWPS and powered access, 'Zip' or scaffold towers, ladders or similar are available. However, it is impossible to remove all work at height from Kayam operations, so competent, trained and correctly equipped crew may be required to access work positions without the benefit of safe access.

Fig WH1. Worker climbing mast using safety line and ASAP unit

Preparation
• PM to ensure client has provided safe working area • PM confirmed that no alternative method available • All crew briefed as to tasks for the day • All crew checked to ensure that they have the correct PPE • Rescue at height plans in place and crew briefed as to procedures • Radios checked • All powered access working correctly and in good order; operators have required competency • Area below task cleared of non-essential personnel

ASAP

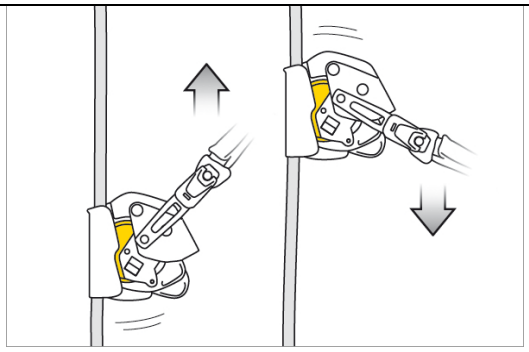
Double Lanyard

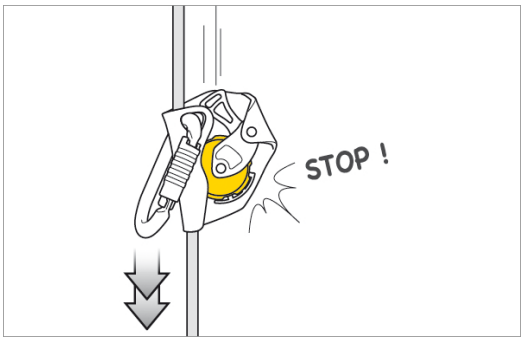


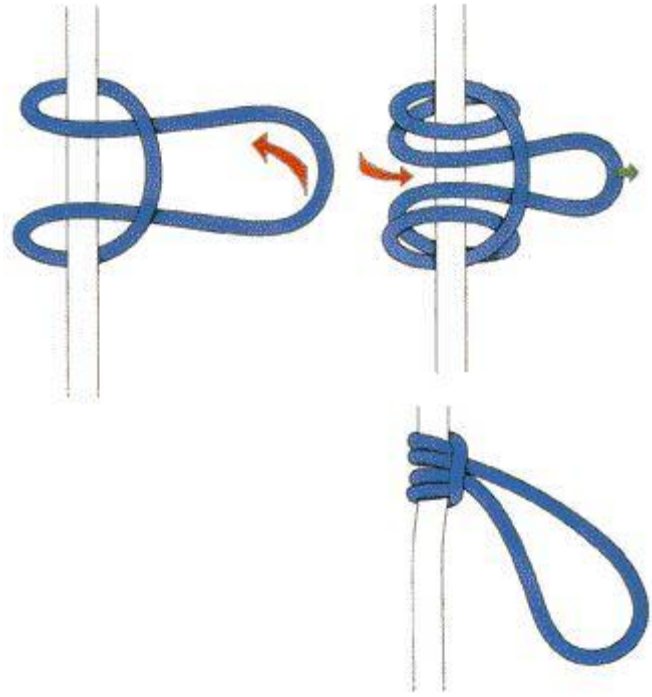
Prusik Knot

Fig WH2. Showing 2 commonly used fall arrest devices

Working at Height – Fall arrest
• The Kayam project manager should ensure that any tower structures that Kayam workers may have to climb are fitted with vertical and horizontal safety lines as part of the construction sequencing. • Workers climbing towers should ensure they have an ASAP fall arrest device attached to their harness for self-rescue or utilise a Prusik Knot if competent in its use. • The ASAP or Prusik Knot can be used for ascending and descending towers and masts and workers should ensure that it is installed to run the correct way







- Once the ASAP or Prusik Knot is fitted, the worker can climb the mast using the cross bracing and maintaining 3 points of contact
- If at any point, the worker needs to stop, either to transfer to another safety line, or to complete a task, they should attach themselves to an appropriate point with a short or adjustable lanyard (grillion) or cow tail

- Where possible, workers will use static safety lines or short lanyards when working in unprotected areas, this gives workers the possibility of self-rescue, if required
- Workers should only use fall arrest devices when no other method is available.
- Fall arrest will not be used where the fall distance is less than 4 metres
- Fall arrestors will only be attached to designated attachment points – on most harnesses, these are marked with an 'A'
- Where workers must use fall arrest devices, as opposed to retractable or inertia reels, they must ensure that the anchor point is as high as possible.

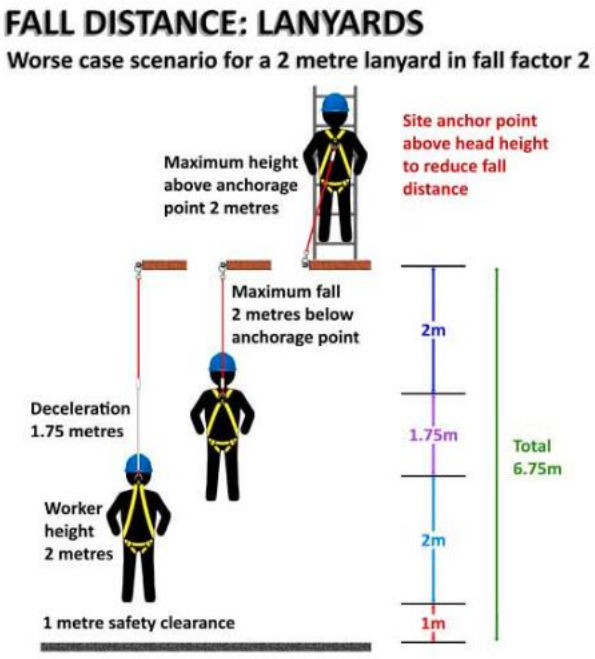


Fig WH3. Showing how to estimate fall distances with a fall arrest device

Working at Height

- When workers are working at height in unprotected areas, they will be double clipped at all times.
- When descending towers, workers will use the same method as for ascending, workers will NOT abseil unless there is no alternative, and they have the correct training, equipment, and PPE.

Fig WH4. Acceptable PPE for working at height

EN 358:2018	Work Positioning and Work Restraint Systems
EN 360:2023	Retractable Fall Arresters
EN 355:2002	Energy Absorbing Fall Arrest Lanyards
EN 362:2004	Connectors
EN 365:2004	Full Body Harness
EN 353:2014	Guided type fall arresters
EN 354:2010	Lanyards
EN 363:2018	Personal Fall Protection Systems
EN 12841:2024	Rope adjustment devices

Rescue at Height – Client Provided
• All workers should be familiar with the procedures to be followed in the event that a rescue at height is required • Immediately notify the clients site rescue team and clear the area around the casualty • If required, request additional lighting • Call for medical assistance • Once the RaH team arrive, they should be briefed as to what happened and any preferred access routes • Kayam crew should be prepared to assist the RaH crew as required

Rescue at Height – Not Client Provided
• All riggers working on behalf of Kayam should ensure that they have suitable rescue at height plans and equipment in place before work at height commences. • In addition, at least one member of the crew should be competent in mounting a rope or 'snatch' rescue • Before any rescue from height begins the crew must first analyse the situation and take into account any risks to either the victim or the rescue team. • DO NOT put the Victim, yourself, or the team's safety at risk • The rescuer needs to ensure they have a full set of equipment to guarantee his and the victim's safety throughout the rescue process. • The rescuer needs to have the training, knowledge, and experience to carry out any rescue from height. • All PPE to be used should meet the minimum safety standards of that country, if you are unsure of the standards in that country you should use Belgian and/or European standards as best practice. • **Steps for Snatch Rescue** • The rescuer should climb to a safe position above the victim using standard techniques. • The rescuer should install 2 ropes (Safety and Positioning rope) to 2 separate anchor points. Each rope will be attached to the 2 separate anchor points by means of a Figure of 8 knot and/or Alpine Butterfly knot. • Rescuer attaches his descending device (type Petzl ID) on the positioning rope and his mobile fall arrest device (type Petzl Asap + Asap'sorber 20/40 cm) to the safety rope. Both devices should be connected to the EN 358 and EN 361 attachment points respectively on the harness. • The rescuer will make a controlled descent towards the victim. • The rescuer will stop their descent when approx. 50cm above the victim • The rescuer will lock their descending device (type Petzl ID) • The rescuer will make an initial assessment of the victim and inform the staff on the ground about the victim's condition. • The rescuer will attach a lifeline (Type Petzl Spelegyca or Jane –no longer than 30-40cm) from his harness (EN 358 central point) to the harness of the victim. If a Kayam-lifeline (Type Petzl Spelegyca) is used with 2 arms, then the 2nd one is also attached onto another attachment point of the victims harness. • **Depending on the situation** • If the victim is hanging in their descending device (type Petzl ID): then the rescuer should manipulate the victims descending device by lowering them so that the victim can be attached to the lifeline of the rescuer. After that, the descending device of the victim is removed • If the victim is hanging in a fall arrest lanyard (type Petzl Absorbica/Prusik) then the

quickest way is to cut this lanyard. **You should only do this if you are fully trained and confident to do so and only after confirming that the victim is attached to the rescuer.**

- If the victim is hanging in a fall arrest device (type Petzl Asap + Asapsorber 20/40cm) then the quickest way is to cut this Asapsorber. **You should only do this if you are fully trained and confident to do so and only after confirming that the victim is attached to the rescuer.**
- If the victim is hanging in a fall arrest device with steel cable OR if the victim is hanging in an ascending device (type Petzl Croll), then the victim should be lifted before he can be taken out of that system. The Petzl JAG-system can be used to assist with this.
- Once the victim is attached on the lanyard/lifeline connected to the rescuer, then a controlled descent can start. In case the rescuer uses a descending device type Petzl ID and the weight of both the victim and rescuer goes above 150 KG, then the descending rope should be used with an extra carabiner for extra friction on the rope.
- The rescuer should descend steadily but not too fast as this may activate the safety device (type Petzl ASAP). If the ASAP locks, then both the rescuer and victim are then trapped at height on the safety rope and may need to be rescued.
- The rescuer should be aware of the condition of the victim when reaching the ground in order to prevent possible suspension trauma. If the victim was hanging unconscious, they should not be laid down flat straight away on the ground but should be seated so blood can flow slowly back out of his or her legs.
- If the victim is an unconscious non-breathing casualty they should be lowered straight to the ground and CPR carried out.

KAYAM	Method Statement	Kayam/MS/5.3

Manual Handling

Processes Involved	• Unloading and loading of vehicles • Movement and stacking of equipment • Assembly of components	**PPE Required** **Bold – compulsory** *Italics – as required*	• **Safety boots** • **Hi-vis waistcoat** • *Hard hat* • *Gloves*
Relevant Hazards and Controls	See ORA		
Other Relevant Safety Documents	Health and Safety Policy Safety Documentation Kayam/MS/5.1, 5.7, 5.10, 5.11		
Relevant Guidance	HSE L117 Rider-operated lift trucks CPA1101 Safe use of Telehandlers in Construction HSE INDG 143 Manual handling at work		
Project Manager/Crew Boss Checks	• Client has provided safe working area • Working area is sufficiently lit • Plant and lifting aids available and suitable for purpose • All crew have suitable PPE and have undergone any site induction • All crew are aware of tasks to be undertaken, and any relevant specific safe working methods and PPE required • Crew aware of access routes and ramps • Any required toolbox talks completed		

Introduction
Manual handling is a regular feature of work for many Kayam, freelance, and local crew. All crew are physically fit to undertake their tasks, and all receive basic training in manual handling. Where possible, lifting aids will be used. Only trained and competent crew will operate any lifting aids.

Pallet/Pump Truck

Sack Barrow

Turntable Trolley

Fig MH1. Showing commonly manual handling aids

General Manual Handling Guidelines

STEP 1

- Think about all the activities in your workplace which involve staff moving materials and assess whether such manual handling is really necessary, for example could you use lifting aids such as trolleys, lift trucks, hoists, dollies or pallet trucks?

STEP 2

- If you can't avoid manual handling, then you need to assess the risks associated with each task involving movement of materials, considering steps 3 - 7 below.

STEP 3 Think about the load

- if it is too heavy, - consider breaking it up into smaller packages?
- if it is difficult to grasp or could shift during carrying - consider placing the load in a container for carrying or binding it together before moving
- if it is awkward - consider using another person to assist, or the use of a trolley

STEP 4 Think about the task

- if it involves twisting, stooping or reaching - consider rearranging the storage facilities by providing more space or shelving or reorganising shelves so that the heaviest items are kept at a height between mid-thigh and mid-chest. Consider also the use of stepladders or platforms for access to higher shelves.
- if it involves long distance carrying - consider rearranging the layout of the workplace to minimise travel by arranging delivery and storage to be as near as possible to the point of use or consider using a trolley or powered truck.
- if it involves repetitive movements – consider varying the work to ensure that one set of muscles can rest while another works.

STEP 5 Think about the working environment

- remove any obstructions in the areas where people need to carry materials and ensure that there are no tripping hazards.
- ensure that lighting levels are adequate.
- if there are steps or ramps - consider use of more than one person or the use of chutes, hoists, or conveyors.

STEP 6 Think about the physical capability of your staff

- ensure the staff you are asking to handle materials are capable of doing so – consider those who are pregnant, or who have a physical weakness.
- train all staff in the safe lifting technique and in the safe procedures you have identified for moving materials.
- instruct staff on the correct clothing and footwear to use.
- provide protective shoes, hats and gloves where necessary.

STEP 7 Remember to assess any new manual handling tasks.

- Ensure that you regularly review and assess projects on a per job basis.
- Sometime crew will have to make on the spot assessments of manual handling loads, crew should use the TILE process for making the assessment:

T.I.L.E.

TASK – what sort of load, where has it got to be moved to, or from, how many loads are there and how many crew will it take to complete the job?

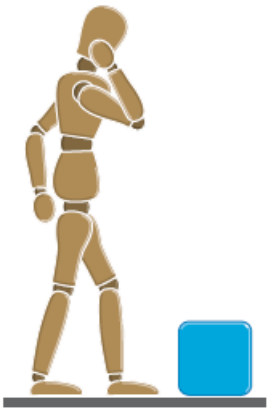
INDIVIDUAL – are the crew physically able to undertake the lift and are there enough of them?

LOAD – how large and heavy is the load, how far do you have to move it, is it an awkward shape or difficult to get hold of?

ENVRONMENT – what is the area like that the load has to be moved in, what are the conditions, is it hot or cold, or is the weather likely to make the load slippery or difficult to handle?

Giving consideration to these factors will help with a safe lifting plan

Good Manual Handling Techniques *(from HSE INDG 143)*



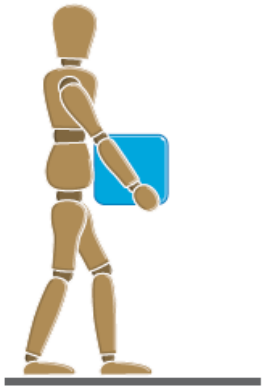
Think before lifting/handling. Plan the lift. Can handling aids be used? Where is the load going to be placed? Will help be needed with the load? Remove obstructions such as discarded wrapping materials. For a long lift, consider resting the load midway on a table or bench to change grip.

Adopt a stable position. The feet should be apart with one leg slightly forward to maintain balance (alongside the load, if it is on the ground). The worker should be prepared to move their feet during the lift to maintain their stability. Avoid tight clothing or unsuitable footwear, which may make this difficult.

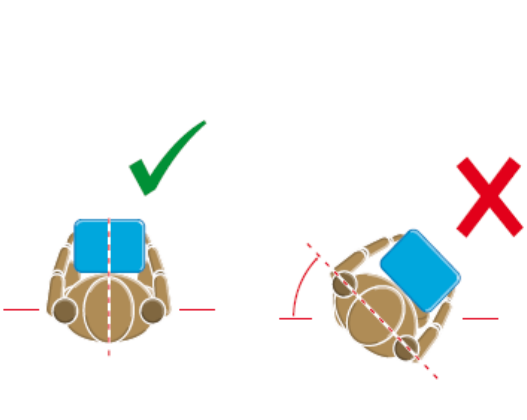
Get a good hold. Where possible, the load should be hugged as close as possible to the body. This may be better than gripping it tightly with hands only.

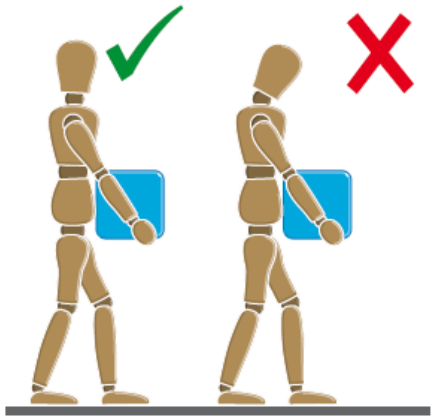
Start in a good posture. At the start of the lift, slight bending of the back, hips and knees is preferable to fully flexing the back (stooping) or fully flexing the hips and knees (squatting).

Don't flex the back any further while lifting. This can happen if the legs begin to straighten before starting to raise the load.



Keep the load close to the waist. Keep the load close to the body for as long as possible while lifting. Keep the heaviest side of the load next to the body. If a close approach to the load is not possible, try to slide it towards the body before attempting to lift it.





Avoid twisting the back or leaning sideways, especially while the back is bent. Shoulders should be kept level and facing in the same direction as the hips. Turning by moving the feet is better than twisting and lifting at the same time.

Keep the head up when handling. Look ahead, not down at the load, once it has been held securely.

Move smoothly. The load should not be jerked or snatched as this can make it harder to keep control and can increase the risk of injury.

Don't lift or handle more than can be easily managed. There is a difference between what people can lift and what they can safely lift. If in doubt, seek advice or get help.

Safe Load Guidelines

The following diagram demonstrates safe loads for the averagely fit person, in various positions.

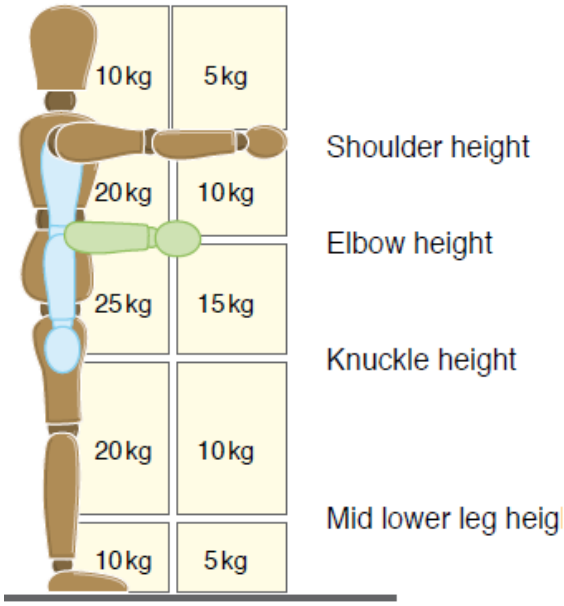


Fig MH2. Safe loads for an average person.

KAYAM	Method Statement	Kayam/MS/5.4

Use of Mobile Scaffold Towers

Processes Involved	• Unloading of vehicles • Working at height	**PPE Required** **Bold – compulsory** *Italics – as required*	• **Safety boots** • **Hi-vis waistcoat** • **Hard hat** • *Harness and lanyard* • *Gloves* • *Safety glasses* • *Hearing protection*
Relevant Hazards and Controls	See ORA		
Other Relevant Safety Documents	Health and Safety Policy Safety Documentation Kayam/MS/ 5.2, 5.3,5.6		
Relevant Guidance	PASMA Operators Code of Practice		
Project Manager/Crew Boss Checks	• Client has provided safe working area • Working area is sufficiently lit • Mobile scaffold tower is complete and is marked to standard EN 1004 • Scaffold wheels are marked with SWL • Crew assembling and using tower are trained and competent • Once tower is assembled, PM to note that pre-use inspection has been undertaken by a competent person		

Introduction
Kayam crew and client provided local crew working with Kayam may sometimes have to use Mobile Scaffold Towers for temporary access or as a temporary working platform at height. Only workers who are trained and competent in the erection and use of Mobile Scaffold Towers should construct or operate these items of equipment

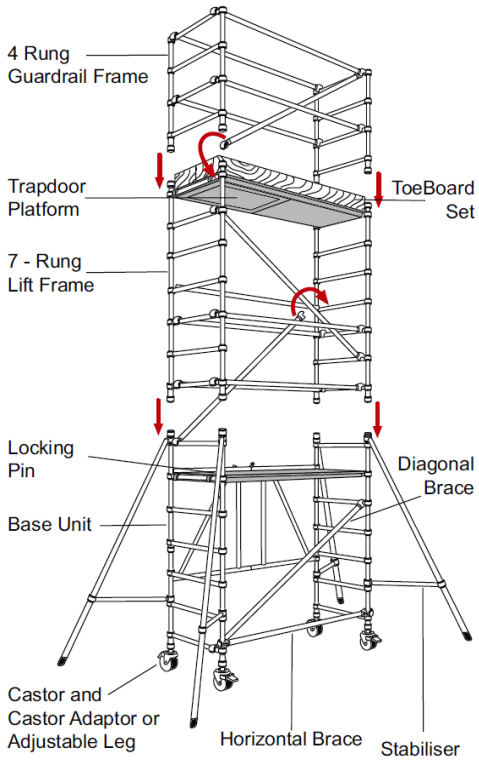


Fig MT1. Typical Mobile Scaffold Tower with main components

Erection of Mobile Scaffold Towers
• Mobile Scaffold Towers should only be erected by a competent person and in accordance with the manufacturer's recommendations • Non-standard parts must not be used • Erectors should confirm SWL on wheels and tower structure • Mobile towers should only be erected on firm level ground • Crew should ensure that all outriggers and wheel brakes are fitted and functional • Crew should confirm that there are no overhead hazards before erecting the tower • Once the tower is complete, a full inspection should take place and be recorded • A pre-use inspection should be carried out before each use • If working at height is required to erect the tower, crew will use full WaH techniques, as detailed in *Kayam MS/6.2* • All guardrails and toe-boards as well as intermediate boards should be installed, as per the manufacturer's recommendations

Fig MT2. Showing correct access method for tower platform

Use of Mobile Scaffold Towers
• Mobile Scaffold Towers should only be used by competent and trained staff • The tower should be positioned with the brakes locked and the outriggers deployed, as per the manufacturer's instructions • Ensure that the tower is stable before climbing • Ensure that the area around and beneath the tower is clear of other workers • Access the working platform by the approved means, crew should never climb up the outside of a tower unless directed to by the manufacturer's instructions • The operator should ensure any hatches are closed behind them as they ascend • Operators should remain on the platform and not stand on the handrails to gain extra reach • If the operator requires to reach out of the platform, they should ensure that they are anchored with a full harness and short lanyard. • The tower must NEVER be moved while personnel remain on the working platform • Before moving, operators should ensure there are no new overhead hazards and that the route is clear • Additional personnel may be required to move the tower, it should be moved smoothly in one direction at a time

KAYAM	Method Statement	Kayam/MS/5.5

Use of Plant
(Forklift Trucks, Telescopic Reach Handlers, MEWPS)

Processes Involved	• Unloading of vehicles • Movement of equipment • Working at height • Use of plant including powered access	**PPE Required** **Bold – compulsory** *Italics – as required*	• **Safety boots** • **Hi-vis waistcoat** • *Hard hat* • *Gloves* • *Safety glasses* • *Hearing protection*
Relevant Hazards and Controls	See ORA		
Other Relevant Safety Documents	Health and Safety Policy Safety Documentation Kayam/MS/5.1, 5.2, 5.6		
Relevant Guidance	INDG 413 Preventing Falls From Vehicles, CPA0902 Working at Height Whilst Loading and Unloading Transport. HSE L117 Rider-operated lift trucks, CPA1101 Safe use of Telehandlers in Construction. CPA1402 Ground Conditions for Construction Plant		
Project Manager/Crew Boss Checks	• Client has provided safe working area • Working area is sufficiently lit • Traffic routes and prohibited areas briefed from client • Plant delivered by client and available and suitable for purpose • All plant operators are competent and can demonstrate competence • Local crew competence confirmed by client and PM • Crew briefed as to tasks • Communications/radios checked, and all crew have PPE • Plant operators aware of refuelling procedures • Plant operators have carried out manufacturers recommended daily checks • Banksmen allocated for any operators who require them • MEWP operators aware of rescue plan		

Introduction

Kayam crew and client provided local crew working with Kayam will often have to use plant as part of their duties. All plant operators must be able to demonstrate competence by means of a recognised training course and refresher training as required. Required plant will be specified by the Project Manager and should be checked as suitable on handover. Any faults or deficiencies must be reported to the client or their representative as soon as possible. Plant should only be used for the purpose intended and returned to the client or their representative as soon as it is no longer required, or in accordance with the clients site requirements

Use of all Plant - Preparation

- All plant operators must carry out the recommended daily checks when they commence their shift
- Any defects must be reported immediately
- Operators who are not familiar with the particular model, or have not operated that model for some time should carry out a familiarisation period so that they are confident in the vehicles operation and controls
- Operators should ensure that they have sufficient fuel for the tasks that they are going to carry out
- FLT and Telehandler operators should ensure that the vehicle has the load capacity chart displayed in the cab and that the forks and carriage are operating correctly
- All operators should ensure that they use restraints where fitted, MEWP operators should use a harness, clipped to the vehicles anchor points
- All plant operators should be sure that they are aware of authorised routes for plant, any relevant ground conditions and any areas where they are prohibited from entering or operating

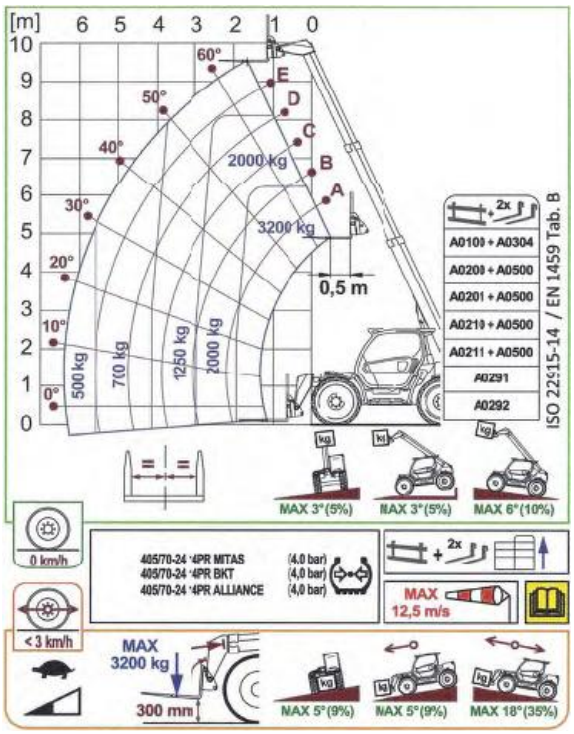


Fig PL1. Typical load capacity chart found in lift trucks

Material	*Weight - kg/m³*
Aluminium	2 700
Brass	8 500
Brick	2 100
Broken Glass	1 290 –1 940
Coal	1 450
Concrete	2 400
Copper	8 800
Earth	1 600
Gravel (loose, dry)	1 522
Iron and Steel	7 700
Lead	11 200
Oil	800
Paper	1 120
Sand (dry)	1 602
Sand (wet)	1 922
Water	1 000
Wood (hard)	500 - 1000
Wood (soft)	350 - 850

Fig PL2. Approximate weight per M³ of some typical materials

Operation of Telehandler

- Telescopic reach handlers can become unstable on uneven ground, or when the load is raised, operators MUST be competent in the use of these machines and aware that the centre of gravity (CoG) will shift
- Before any lift, the operator MUST ensure that the load is within the capability of the machine – where loads are not marked, it may be possible to estimate them by using the values in Fig PL2 – load capacities for the machine can be found on the load capacity chart in the cab
- Loads should be checked for stability before moving off
- Loads should be carried as low as possible, whilst still allowing the operator suitable vision
- Loads should only be raised to clear obstructions and operators should negotiate these carefully
- Telehandlers should not laterally transverse a slope with a load
- Telehandlers should not travel with a load boomed out, the boom should be retracted before moving off.
- When booming out to lift or lower loads, operators should deploy the jack legs
- Jack legs should not be deployed next to trenches or excavations – they should be at least a minimum of the trench depth away
- When negotiating a slope, the load must face uphill and the operator should drive straight up the gradient; when there is no load, the boom should face downhill
- Telehandlers should only be used to lift suspended loads if the machine has the correct attachments
- Operators should be aware of the possibility of CoG shift with suspended loads
- Operators should be aware of the safe working distance to overhead power lines.

Operation of Telehandler - continued
• Telehandlers are designed to lift loads, not people. The only circumstances in which a telehandler may be used to lift people for planned work is with an integrated working platform which must comply with EN 280 • In extreme circumstances, i.e. for emergency repairs, it may be possible to use a non-integrated work platform, however this would be subject to completion of a suitable risk assessment and safe system of work

Type of Power Line	Exclusion Limit with Boom at Maximum Extension
Low-voltage line	1m
11kV & 33kV (pole mounted)	3m
132kV (steel tower mounted)	6m
275kV & 400kV (steel tower mounted)	7m

Fig PL4. Closest working distances to power lines with boom at maximum extension

Operation of Forklift Truck (FLT)
• Forklift trucks can come in a number of different forms: Counterbalance, All-terrain or Side-loader – the operator must be competent and have been suitably trained in the operation of the particular machine. Normally, Kayam crew will use all terrain FLT or telehandlers • Before any lift, the operator MUST ensure that the load is within the capability of the machine – where loads are not marked, it may be possible to estimate them by using the values in Fig PL2 – load capacities for the machine can be found on the load capacity chart in the cab • Loads should be checked for stability before moving off • Loads should be carried as low as possible, whilst still allowing the operator suitable vision • Loads should only be raised to clear obstructions and operators should negotiate these carefully • Operators should brake carefully when carrying elevated loads

Counterbalance All-terrain Telescopic Reach Handler

Fig PL4. Types of forklifts used on site by Kayam

Operation of Forklift Trucks & Telehandlers
• People should never be lifted on the forks, or on pallets or stillages; only approved attachments may be used for lifting people • Operators should always use any restraint device fitted to the machine when there is a risk of overturning, or when travelling on rough terrain • Passengers may only be carried on seats which have been fitted for the purpose • Forks and telehandlers should always be parked with the forks grounded • Operators must never disable audible or visual warning devices fitted to the machine • Operators should use the assistance of a signaller or banksman when vision of the load or route is impaired

Operation of Hydraulic Hammers (Pecker)
• The pecker can be used to reduce the risks and hazards which result from manually hammering in stakes • It should only be used by experienced plant operators who have completed the appropriate training • The client should inform the Tentmaster about the location of any underground services, if relevant and these should be marked on the ground • The operator should check the correct operation of the attachment before use • Care should be taken when attaching or detaching hydraulic hoses • The stake should be 'started' manually, ensure hands are clear of the area before using the pecker • Crew should ensure that they have the appropriate PPE for the task • If the pecker operator does not have a clear view of the stake, a crew member should be positioned so that they can see the stake and also give signals to the operator • When withdrawing the stakes with a FLT or Telehandler crew should ensure that no unnecessary persons are in the area and that slings are fully tightened on the stake before withdrawal • Stakes should be withdrawn at the reverse of the angle in which they are installed

Fig PL5. – Pecker Attachment

MEWPs

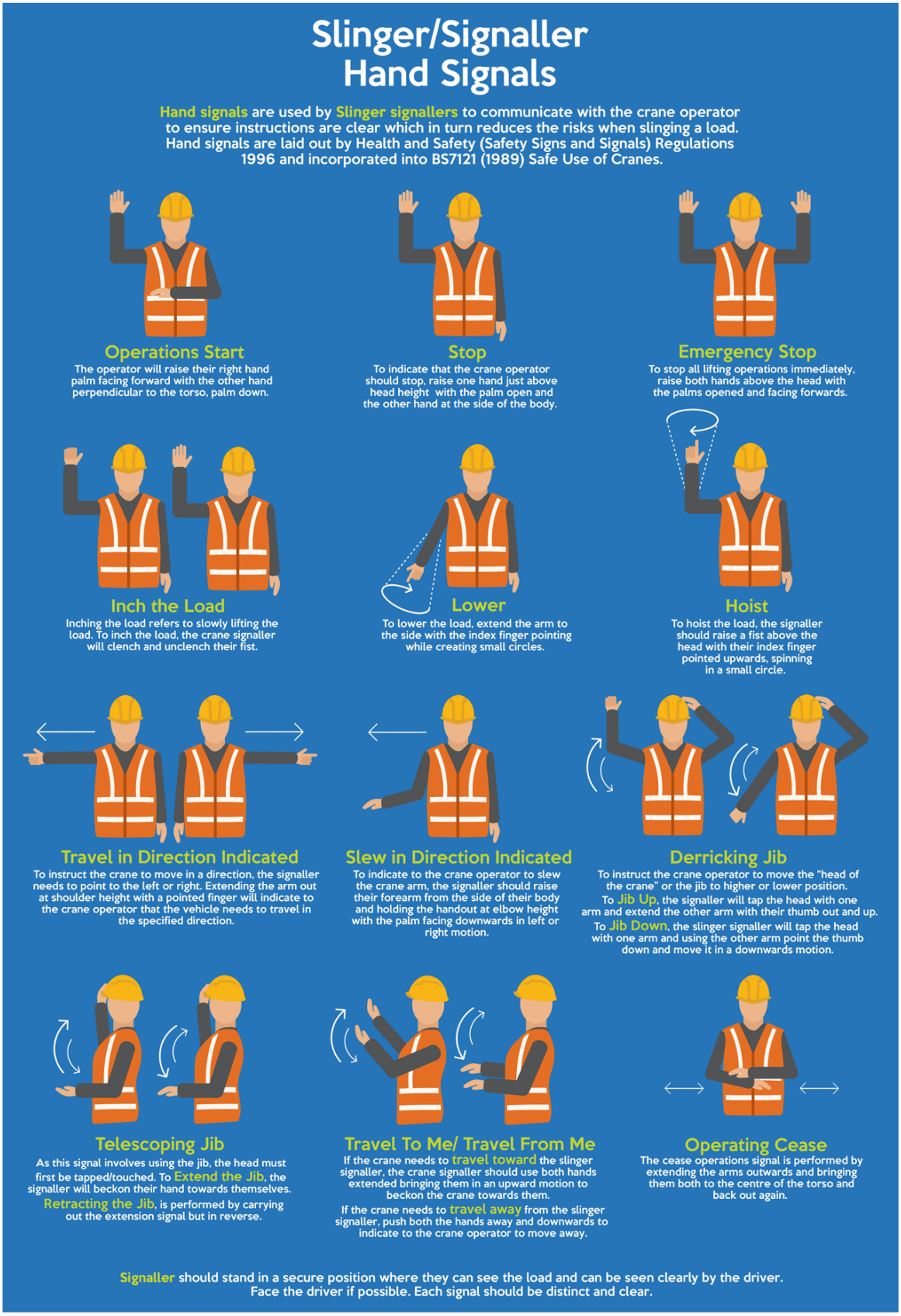
- Mobile Elevated Work Platforms (MEWPs) provide a safe access solution when work at height is required; Kayam crew will often use either a 'Scissor' lift or Mobile Boom, or occasionally, a Vertical Boom. Operators should be competent in the type and model of machine
- On taking over any MEWP, the operator must ensure that they are familiar with the machine and that the manufacturers operating instructions are present
- MEWP operators should be aware of emergency procedures for the particular model, including emergency descent.
- MEWP operators should ensure that they have a full harness, secured to a manufacturers anchor point unless in the following exceptional circumstances (which should be considered by a specific risk assessment):
    - When using static vertical MEWPs
    - When working on, or over water
    - When moving the MEWP short distances on flat level ground with the boom lowered
- Before beginning the task, the MEWP operator should check the ground conditions and proposed routes of travel; they should also check for any overhead hazards such as; power lines, trees, structure projections etc.
- Operators should ensure that they are working within the safe working load of the machine at all times
- Operators should ensure that if windspeeds approach or exceed the safe working limit of the machine, that they lower the boom and stop work until conditions are suitable

Fig PL5. MEWP anchorage point for operator and IPAF emergency descent location indicator

General MEWP Operations

- Ensure that there are no workers beneath the area in which the MEWP is working
- If materials are to be lifted, the operator must know the size and weight and ensure they are within the carrying capacity of the machine. Materials should not be supported on the handrails
- Operators should not allow the foot or hand controls to become obstructed by equipment
- Operators must be aware of the location of any overhead power lines – where power lines are present, the boom should not be able to reach within 6m of the line when fully extended
- MEWP operators should not stand on the handrails to gain extra reach
- Operators should be aware of the possibility of trapping or crushing against structures whilst in the MEWP basket
- MEWPs may be used to access a place of work, if it is deemed the safest method; when transferring from a MEWP to a workplace at height, operators must ensure that they are clipped onto the structure, before unclipping from the MEWP – they should then use normal work at height techniques – *see MS/WH1*
- When travelling, the working platform should be lowered and face the direction of travel

Fig PL6. Hand Signals for Crane or Telehandler use



KAYAM	Method Statement	Kayam/MS/5.6

Safe use of Ladders/Stepladders

Processes Involved	• Working at height	**PPE Required** **Bold – compulsory** *Italics – as required*	• **Safety boots** • **Hi-vis waistcoat** • **Hard hat** • *Harness and lanyards* • *Gloves*
Relevant Hazards and Controls	See ORA		
Other Relevant Safety Documents	Health and Safety Policy Safety Documentation Kayam/MS/5.1 5.2		
Relevant Guidance	INDG 402 Safe Use of Ladders EN 131 Parts 1 - 7		
Project Manager/Crew Boss Checks	• Client has provided safe working area • Working area is sufficiently lit • Ladders are compliant with EN131 Commercial class • Local crew with correct skills • All crew have suitable PPE and have undergone site induction • All crew are aware of tasks to be undertaken and any relevant specific safe working methods and PPE required • Any required toolbox talks completed		

Introduction
Where work at height is necessary you need to justify whether a ladder or stepladder is the most suitable access equipment compared to other access equipment options. Kayam crew and client provided local crew working with Kayam may sometimes have to use Ladders and Stepladders for temporary access for working at height. Only workers who are trained and competent in the use of Ladders or Stepladders should these items access equipment.

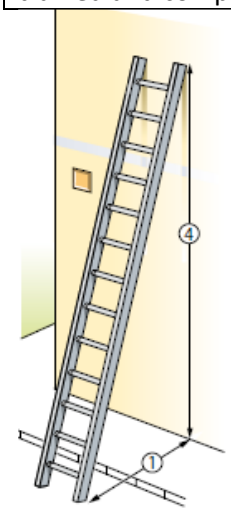


Fig LA1. Correct ladder angle

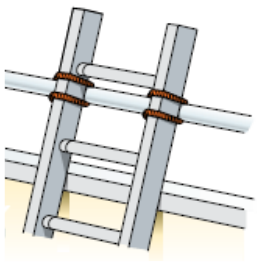


Fig LA2. Tied in ladder

Safe use and correct set up

- Ladders and stepladders should be checked for visual defects before use and replaced if damaged.
- Ladders should be placed on firm and level ground or spread the load (e.g., use a board)
- For stepladders refer to the manufacturer's instructions, for ladders the maximum safe ground slopes on a suitable surface (unless the manufacturer states otherwise) are as follows: side slope 16° – but the rungs still need to be levelled, back slope 6°
- Placed on clean, solid surfaces (paving slabs, floors etc). These need to be clean (no oil, moss or leaf litter) and free of loose material (sand, packaging materials etc) so the feet can grip. Shiny floor surfaces can be slippery even without contamination.
- You should only use ladders or stepladders where they will not be struck by vehicles or site plant, by protecting them with suitable barriers or cones.
- Prevented pedestrians from walking under them or near them, by using barriers, cones or, as a last resort, a person standing guard at the base.
- Ladders should be put up at the correct angle of 75°. To judge the angle, use the angle indicator marked on the stiles of some ladders or the 1 in 4 rule (1 unit out for every 4 units up see Fig LA1
- Restraint devices on stepladders must be fully opened. Any locking devices must also be engaged
- Tie the ladder to a suitable point, making sure both stiles are tied, see Fig LA2, where this is not practical, then securely wedge the ladder, e.g., against a wall
  If none of the above can be achieved, foot the ladder. Footing is the last resort and should be avoided, where reasonably practicable, by the use of other access equipment.

Fig LA3. Three points of contact

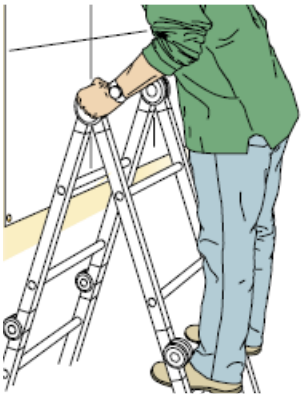


Fig LA4. Correct rung position

Suitable use of Ladders/Stepladders

- As a guide, only use a ladder or stepladder in one position for a maximum of 30
- Minutes for 'light work' - they are not suitable for strenuous or heavy work.
- If a task involves a worker carrying more than 10 kg up the ladder or steps it will need to be justified by a detailed manual handling assessment.
- Must maintain three points of contact (hands and feet) at the working position. On a

ladder where you cannot maintain a handhold, other than for a brief period of time, other measures will be needed to prevent a fall or reduce the consequences of one. See Fig LA3

- On stepladders where a handhold is not practicable a risk assessment will have to justify whether it is safe or not.
- On a ladder or stepladder do not overload it - the person and anything they are taking up should not exceed the highest load stated on the ladder.
- Do not overreach - keep your belt buckle (navel) inside the stiles and both feet on the same rung throughout the task.
- When working on stepladders you should avoid work that imposes a side loading, such as hanging side walls to the tent, by having the steps facing the work activity. Where side-on loadings cannot be avoided you should prevent the steps from tipping over, for example by tying the steps to a suitable point. Otherwise, a more suitable type of access equipment should be used.
- Ensure the ladder or stepladder is long enough for the task.
- Don't use the top three rungs of a ladder. If used for access it should project at least 1 m above the landing point and be tied in.
- Don't use the top two steps of a stepladder unless a suitable handrail is available on the stepladder. See Fig LA4

KAYAM	Method Statement	Kayam/MS/5.7

Erection of Kayam Tent Structures

Processes Involved	• Unloading of vehicles • Movement of equipment • Working at height • Use of power tools	**PPE Required** **Bold – compulsory** *Italics – as required*	• **Safety boots** • **Hi-vis waistcoat** • **Hard hat** • *Harness and lanyard* • *Gloves* • *Goggles* • *Hearing protection*
Relevant Hazards and Controls	See ORA		
Other Relevant Safety Documents	Health and Safety Policy Safety Documentation Kayam/MS/5.1, 5.2, 5.3, 5.5, 5.6 Kayam Tent books		
Relevant Guidance	HSE INDG401 Working at Height. Temporary demountable Structures. Guidance on procurement, design, and use (fourth edition)		
Project Manager/Crew Boss Checks	• Suitability of access routes for vehicles • The area is large and sufficiently level for the safe and efficient operation of the concert tent with regard to the tent structures and distances between vehicles, unobstructed escape routes, emergency service access • Client has provided safe working area and presence of underground services (if any) have been identified and are clearly marked by the organisers of the event prior to driving any stakes into the ground • Plant available and suitable for purpose • There are no overhead obstructions, or full compliance with statutory minimum distances between structures • Local crew with correct skills • All crew have suitable PPE and have undergone site induction • All crew are aware of tasks to be undertaken, and any relevant specific safe working methods and PPE required • Any required toolbox talks completed		

Introduction

The structure described is a mechanically tensioned membrane structure, of modern design with the use of synthetic fibre webbings, (rated at 12 tonnes breaking strain) to reinforce the plane of the roof running down the seams.

Modern tents usually have some form of bridgework for the main supports or 'King Poles' as they are known. These bridges or 'booms' as they are called when they move up and down with the tent roof, are to move the King Poles out of the performing area. On the KAYAM & VALHALLA, this is achieved by the use of high-capacity webbings forming a catenary belt that travels up and down with the bale rings and roof. The KAYAM & VALHALLA are reinforced with so many different

webbings and strips of fabric, that even if the panels were removed, the structure would still stand! The KAYAM tents have panels stitched or radio frequency welded together, which radiate from a central suspension point out to the side points. This equates to the Centre or King Pole out to the outside pole or side pole. To accept wind load and to tension the roof membrane, this type of structure traditionally distributes its surface load down heavily reinforced webbings and or cables to either a rim band or eaves band, down the section lacings. This type of construction utilises the strength of the webbings to provide massive strength down the seams and is now being employed across the world for some of the largest mechanically tensioned structures ever built.

Erection Method

Marking out

- First you must mark out the site to the arrangement on the site layout plan, checking that the King Poles are square to each other and not twisted.
- The King Poles themselves need to be laid out with the bottom of the poles pinned to the bases, which form a hinge. The end poles then face each other as they are laid out.
- Once the poles have been laid out, the winches, bale rings and rigging can be installed, at the same time that the main guys are being attached and fastened to the ground anchors. Ground anchors can be strengthened by reinforcing the main stake with others.
- The lifting cables are given a 'start' to help the poles lift, either by raising the first pair of poles to about 30 degrees from horizontal using a telehandler, or by using a telehandler to raise the lift-cable to a good angle to raise the pole from.
- If the second method is used, the telehandler should be positioned near the base of the poles that require lifting first. Obviously, if they were placed halfway between the poles, as the poles weigh the same amount it would not be known which set of poles would lift first.
- The tent master must inspect the whole site, including tightness of ropes on main guys, and checking that anchors have gone all the way into the ground.

Stakes and Staking

- The angle of the stake. The stake should be perpendicular to the line of pull. The line of pull should be greater than 45 degrees from horizontal, if there is a 4.5 metre side pole, then the stake should be no more than 4.5m from the bottom of the pole. Even at this you have to half the included angle between the pitch of the roof and the perpendicular side pole, and if a straight line is taken down the slope of the roof the stake should always be closer to the wall than where such a line would meet the ground.
- If the stake is placed too close to the side wall of the tent, the rope will be pulling up more than across the head of the stake and this will reduce its effectiveness.
- If the stake is too far from the side wall of the tent, then it will be pulling out but not down. Obviously, stakes should never be inclined towards the tent.
- Stakes have been shown to have an average pull out figure of 1.2 - 1.4 tonnes with a potential maximum of in excess of 2 tonnes, when used with a diameter of 45-50 millimetres (1.7-2 inches), with a length of 1.5-1.7 metres (5-6 feet). In any case stakes driven most of the way in, should, (even in soft ground), hold down with a force of at least .9 tonnes, and once again in severe weather conditions or soft soil conditions two stakes would then be required for each side guy not just one.

Erection Method

Hoist poles one and two

- Once all guys, winches, bale rings and lifting cables have been checked, and the immediate area cleared of unneeded people, the first pair of King poles can be hoisted. this is done using either Tirfors or through the use of electric motors.
- If Tirfors are used, the cables must be checked to ensure that they have no spidering or spaghetti effect on the cable. Although this sounds funny it is in fact extremely dangerous if it gets stuck inside the Tirfor winch, as you would not be able to lift the tent up or down. For this reason, lifting systems must be devised to allow the cable to be replaced while the tent is in the air.
- During the hoisting process, the Tentmaster should stand back to get a clear view of the lifting process. With a good field of view, the Tentmaster can see potential problems before they happen. A man must be placed by each back guy to ensure the correct tying off, and that there is no movement of the anchors. The cables must be kept free for the whole time the poles are in the air, to make sure the cables don't snag anywhere. At this stage the poles are in a hazardous condition. This is acceptable practice provided there are no better ways of achieving the operation. Remember the dictate "Safety at work requires the reduction of unacceptable risk". The obvious answer to this is that some risk is acceptable, if in control. Risk to personnel should always be minimised by keeping them out of harm's way. At this point in the erection period, the first pair of poles upright, kept aloft by the side guys, the rear guys, and the lifting cables to the other two poles.

Hoist next pair of poles

- If the winches were to be kept running, once the rear guys became tight, the next pair of poles would lift off the ground. This is to be avoided, as the time taken to check the guys is never wasted. If the poles are raised approximately one metre from the ground, the stakes holding the load opposite the previous pair of poles should have a special check to see if they have 'pulled' under the load of hoisting the weight.
- Once they have been checked and made safe, the other pairs of poles can be raised, two by two. When the poles are 1- 2 metres (3-6 feet), from being tight, all the poles will sway if allowed, as there is very little other than their own weight holding them upright until the cables go tight. This is the point where the Tentmaster needs four or five pairs of eyes! Once raised, the Tentmaster should walk around the site checking that the poles are plumb (upright), and that the main guys are adequately tied off and secure.

Assemble at ground level

- At this point the bale-rings can be assembled at the foot of the kingpoles and connected to their lifting cables. The rolled fabric sections can then be unrolled onto the ground and spread out. The side poles should be laid out around the perimeter of the tent. The sections can then be connected to the bale rings. All sections can now be laced. The lacing safety fittings should be checked, and the rain flaps tied down. Kayam sidepoles can now be attached. Valhalla sidepoles are attached after the roof is up. Once all is assembled, the roof can be lifted to a suitable height for the next operation.

Raise side poles

- On the Kayam style tents, the next step is to raise and secure the sidepoles. Starting at a lacing facing away from the direction of wind, stand the side poles up. The lacing side

Erection Method
poles should have two extra guys called cross guys which tie out at forty-five degrees to the lacing. These are to stop radial twist in the roof and keep the alignment of the lacing where it should be. When all the side poles are vertical, the rim of the tent should have no looseness or sagging at any point. **Raise the roof** • The Tentmaster should stand back to watch the roof being hoisted to make sure that the necks don't snag anywhere on the poles, or that the roof is twisted in any place. Raise the roof to its full height. **Install Valhalla sidepoles** • Valhalla sidepoles are installed after the roof has been set at its final height. There are various ways this is done. The sidepoles are long, heavy and of varying length (between 6 & 8m). All methods require mechanical aid in order to lift the sidepoles and to give access at height to enable the installation. **Dressing Out** • The KAYAM can now be 'dressed out'. A simple eyeball check is all that is needed to ensure that the roof is pulled out in a regular manner. To check if the roof is 'regular', stand on one axis (long or short), and look carefully down the tent. The seams of the tent should be in line from one end of the tent to the other. With no wrinkling in the roof, or pulls or creases, (in other words, the roof is pulled out 'flat'), and the main seams in line, the tent has to be well dressed. It is imperative that the bale-rings are lifted to the same height in respect of the membrane roof and each other. **Pretension** • The roof can be well dressed and yet not tight enough! Unless the structure is new and requires stretching, the roof should sit in its intended shape without too much tension in the plane of the roof. It is necessary to pretension the roof (prior to it being tensioned by wind loads), to tension radially as well as down the seams. This means that the rim and the quarter band must have some tension in them running round the surface of the roof. At this stage the roof must be raised up the poles the last amount to its intended height. The side guys should be adjusted to keep the Rim taut, with just a small amount of looseness somewhere around the Rim. **Sign – off Structure** • The final inspection or 'Signing Off', is important to the operating company, to the client, and to the general public. • A general check of the main guys, the side guys, and the rigging of the tent, in conjunction with a visual check of the stakes at all points. • As the client is responsible for the structure during the event, they should accompany the Tentmaster, if possible, on his/her final inspection and order the office to issue a TDS Sign off document to the client.

Fig EK 1. Ground Anchors/Stakes

Fig EK 2. Stake pull test

Fig EK3. Raising kingpoles

Fig EK 4. A-Frames poles supports

Fig EK 5. install of bale-ring cover.

Fig EK 6. Complete Kayam

Fig EK7. Process for ensuring integrity of stakes