



STANDARD OPERATING PROCEDURE

FORM NO.HSE/CORP/4

ACTIVITY	Excavation			SITE	SMC	DEPARTMENT	Mining
SOP NO.	IMFA/SOP/SMC/MINING/08	REVISION	00	EFF DATE:	19.6.14	NO. OF PAGES	Page 1

Step No.	Activity (WHAT)	Associated Requirements/ Hazards/ Impact	Process / tools / PPEs (HOW)	Responsibility (WHO)	Remarks / Reference
1	Identification of area and deployment of man & machine	OH&S – Nil			
		Environment - Nil			
		Quality– i)Authorised person will operate the excavator. ii).Un authorised person will not ride on a excavator. iii)Define the area to be worked	i-a)Authorised person shall be allocated & issued key to operate the excavator. b)The excavator shall be started with proper key. c)all pre-starting procedure recommended by the manufacturer shall be followed. ii)No person other than the operator or manager or any person so authorised in writing by the manager shall ride on a excavator. iii)The operator shall work only in the area where he is allotted to work for.	Shift Incharge/ Excavator Operator Shift Incharge Shift Incharge/ Excavator Operator	DOCNO. WI/OPRN/07
2	Pre-start & after start checking of Excavator	OH&S – i)Slip/Fall	i)During climbing and getting down from excavator, keep both hands free. Use handholds and step plates.	Excavator Operator	DOCNO. HIRA/MINING/08
		ii)Slip/Fall	ii)The ladders and handrails in excavator shall be free from oil,grease and dirt(slippery condition)	Excavator Operator	
		iii)Slip/Fall	iii)See that walkways in or about the cab of excavator are free of loose tools, grease containers or other materials that might fall or give rise to tripping hazard.	Excavator Operator	
				Excavator Operator	



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		<p>iv)Slip/Fall</p> <p>v)Vision problem</p> <p>vi)Strike to persons near by</p>	<p>iv)Any spilled/ leaked oil is cleaned by cotton waste.</p> <p>v)Keep the cab. window clean so as to ensure clear vision at all time.</p> <p>vi)Clearance around the excavator will be judged and should not be operated, when persons are in such proximity as to be endangered..</p>	<p>Excavator Operator</p> <p>Excavator Operator</p>	
		<p>Environment -</p> <p>i)Oil leakage or white smoke</p> <p>ii)Air pollution(smoke) due to fire</p> <p>iii)Air pollution(smoke) due to fire</p> <p>iv)Heat, dust, noise</p>	<p>i)During starting ensure any oil leakages of the system, excessive black smoke or white smoke from the exhaust etc. and report accordingly.</p> <p>ii)Check engine compartment for dirt, debris, oily rags and leaks etc.</p> <p>iii)Check the working order of AFDS system and adopt recommended procedure for testing at a given intervals as prescribed by manufacturer.</p> <p>iv)Check the effectiveness of air conditioner so as to render adequate protection to the operator against heat, dust, noise etc.</p>	<p>Excavator Operator</p> <p>Excavator Operator</p> <p>Mechanical Engineer</p> <p>Mechanic</p>	<p>Aspect No.12</p> <p>Aspect No.17</p>



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		Quality-					
		i)Pre start checking		i)Check the followings: a)position of arm and boom for any cracks, b)track chain condition c)bucket condition & tooth points h)diesel & water level (diesel in fuel tank & water in radiator		Excavator Operator	DOCNO. WI/OPRN/07
		ii)Check after starting		ii-a)Fasten your seat belt. b)Check the operating parameters by turning the ignition key to 1 st point. If OK then start the engine. c)Check for all safety alarms, AFDSS, Air conditioning, lights etc. d)Confirm the location of bystanders before moving, swinging or operating the machine. e)Unlock the Pilot control shut off lever to ON position. Raise the boom, stick, bucket cylinder to maximum position to check if there is any dropping in hydraulic cylinders. f)Swing the machine to check if swing brakes are working properly. g)Maintain proper RPM for smooth operation(Low RPM 850 to High RPM 1850).with tolerance +-50 h)Before driving the machine, always confirm that the travel levers/pedals direction corresponds to the direction you wish to drive.		Excavator Operator	
				iii)If any fault found, report forthwith to		Excavator Operator	



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			the concerned supervisor and do not work unless satisfied of its safe working order		
		iii)Reporting of defunct(if any)			
3	Marching	OH&S	i)View the area around for people or obstructions and ensured safe before marching. Sound horn before starting or moving the machine. Follow the following code of signals before moving the excavators (a)1- rap-starting (b)2- rap-moving forward (c)3- rap- moving reverse (d) very long rap- drawing the attention of the supervisor. ii)Do not travel the excavator down hill in reverse. iii)Do not travel the excavator across the slope iv)Do not drive the machine without locking the door properly. v)During marching, no part of the machine should be brought to within 3 meters of high voltage lines.	Excavator Operator	DOCNO. HIRA/MINING/08
		i)Backing over/striking to persons		Excavator Operator	
		ii)Chances of toppling of work equipment		Excavator Operator	
		iii)Chances of toppling of work equipment		Excavator Operator	
		iv)Fall from machine during marching.		Excavator Operator	
v)Electrocution					
		Environment -Nil			



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		Quality – i)Traveling of machine	i)Do not over speed the excavator nor act in such to cause unsafe condition. a)When traveling on level ground, pull in the work equipment and keep at a height of 40 to 50 cm from the ground. b)Do not march the excavator more than 10 Km/Hr. c)When traveling on slopes, raise the buckets up facing the direction of travel approx. 20 to 30 cm from the ground.	Excavator Operator	
		ii)Obey road signs.	ii)During marching, obey road signals and signs etc.	Excavator Operator	DOCNO. WI/OPRN/07
4	Preparation of loading face & placement of Excavator	OH&S – i)Toppling of the machine.	i)When being operated in soft or unstable ground, excavator shall be supported on mats, heavy planks so as to distribute the load of the machinery over large area and prevent its toppling.	Excavator Operator	DOCNO. HIRA/MINING/08
		ii)Fall of material on the equipment	ii-a)Observe high wall and dress as per needs. b)Always stay clear of over hang and slide areas. c)Never undercut the face.	Excavator Operator	
		iii)Striking by/hitting by materials	.iii)If more than one machine is in use in any area,(either in same bench or on different benches)- a)maintain adequate space for safe operation b)ensure no danger from flying pieces of stones from one machine to the other.	Excavator Operator	



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		Environment -Nil			
		Quality – i) Make a stable base for excavator ii) Make the base leveled iii) Never leave the machine in an unstable condition.	i) The excavator will be operated from a platform sufficient to sustain its load during the operation. ii) Ensure proper leveling of machine before shoveling. ii) When not in use, excavator shall be moved to and stood on stable ground.	Excavator Operator Excavator Operator Excavator Operator	DOCNO. WI/OPRN/07
5	Deployment of dumper & checking of surroundings by operator	OH&S – i) Collision between shovel bucket & dumper's dump body ii) Strike to persons/near by equipments	i) To prevent collision between shovel bucket & dumper's dump body, the bucket of the shovel is raised at a sufficient height (clearance between dump body & shovel bucket is atleast 1 mts). ii) Always be sure of all persons and obstacles are clear before swinging or moving machine in any direction due to reason that bystanders may not consider the swing radius at the rear of larger machine.	Excavator Operator Excavator Operator	DOCNO. HIRA/MINING/08
		Environment -Nil			
		Quality- i) Positioning of dumper near	i) Raise and swing the empty bucket to	Excavator Operator	DOCNO. WI/OPRN/07



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		<p>the excavator</p> <p>ii)Placement of dumper near the excavator</p> <p>iii)Drawing attention for exact placement of dumper.</p>	<p>help the dumper operator in placing the dumper.</p> <p>ii)The dumper shall be kept in such a position near the excavator that the excavator swing is 90 or less.</p> <p>iii)A long horn (signal) is given for stopping of dumper for correct placement.</p>	<p>Excavator Operator</p> <p>Excavator Operator</p>	
6	Loading of materials to dumper	<p>OH&S –</p> <p>i)Fall from the machine</p> <p>ii)Fall from bucket</p> <p>iii)Fall from height</p> <p>iv)Striking by bucket swing or fall of materials</p> <p>v)Hit by moving dumper/machine</p> <p>vi)Striking by machine</p>	<p>i)Wear a seat belt at all times, while the excavator is operative.</p> <p>ii)Do not allow any one to ride on the bucket of excavator for any cause.</p> <p>iii)Never use buckets or other attachment as a staging platform to workers for any reason.</p> <p>iv)During loading, the dumper driver will stay in the cabin.</p> <p>v)A spotter place above the ground level will be made and provided for the supervision at every machine point. No supervision will be allowed in the barrier.</p> <p>vi)Ensure clearance of machine and person within 30 m during operation. No person will stay in the working radius of machine.</p> <p>vii)Do not swing the work equipment</p>	<p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p>	<p>DOCNO. HIRA/MINING/08</p>



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		<p>vii)Chances of toppling of work equipment</p> <p>viii)Tipping down the bench</p> <p>viii)Fall of boulder on the way</p> <p>ix)Striking to dumper cabin</p> <p>x)Striking to persons or other equipment</p>	<p>from the uphill side to the downhill side, when the bucket is loaded.</p> <p>viii)Keep/maintain the safe distance from the edge.</p> <p>viii)Do not over load the dumper or leave any boulder to the dumper in a unstable condition so that there will be a chance of falling on the road..</p> <p>ix)Do not swing bucket over dumper cabin.</p> <p>x)No two excavators shall be operated within 60 meters of each other.</p>	<p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p>	
		<p>Environment –</p> <p>i)Generation of dust</p> <p>ii)Dust in ambient air</p> <p>iii)Noise</p>	<p>i) During loading materials should be casted from a minimum height to avoid spillage.</p> <p>ii)Use dust mask while out of the cabin.</p> <p>iii)To prevent exposure to noise, operator should operate with door closed condition.</p>	<p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p>	<p>Aspect No.11</p> <p>Aspect No.11</p> <p>Aspect No.13</p>
		<p>Quality –</p> <p>i)Loading to dumper bed</p>	<p>i-a)Load the dumper from the rear or side to make the load centralised and balanced.</p> <p>b)To avoid striking of bounce</p>	<p>Excavator Operator</p> <p>Excavator Operator</p>	<p>DOCNO. WI/OPRN/07</p>



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			<p>material/damage to dumper bed, do not drop material into tipper bed from unnecessary height.</p> <p>c)After loading of dumper is completed, the dumper operator is informed by a long horn(signal) for dumper movement.</p> <p>d)Maintain the floor leveled- proper digging & crowding so that bench will be smooth for dumper hauling as well as accumulation of water can be avoided.</p> <p>e)Do not allow any unauthorized persons to operate the excavator.</p> <p>f)Never try an oversize or handle big boulder in an unstable condition.</p> <p>g)Avoid fast swings, hoists or sudden braking. Be sure of the working range and lifting capacity of the machine at all time.</p> <p>h)Keep machine under control and in safe operating condition at all time.</p> <p>ii)Whenever any abnormality is noticed during the operation of excavator, he shall forthwith stop the excavator and report the same to the concerned supervisor. Till fault is rectified properly, he shall not operate that excavator.</p>	<p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p>	
7	Parking of the equipment	<p>OH&S –</p> <p>i)Striking by other equipment</p>	<p>i)Select a safe parking area and place the equipment there. Never park in active work areas.</p>	Excavator Operator	DOCNO. HIRA/MINING/08



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		ii)Run over iii)Run over	ii)If necessary to park on an incline, the equipment will be blocked against motion or turned towards embankment. iii)All controls will be in parking position. Swing lock or brake and parking or traction brake or lock will be set to prevent machine movement.	Excavator Operator Excavator Operator	
		Environment - Nil			
		Quality - i)Parking of machine	i-(a)At end of the shift, machine shall be moved out the face, bucket lowered & kept in on a level ground. (b) Run the engine at idle speed for few minutes to cool down. c)Stop the engine and remove the key. d)Pull the pilot control shut off lever to LOCK position. e)Lock the cabin	Excavator Operator	DOCNO. WI/OPRN/07
8	Recording the inspection in a Log Book	OH&S – Nil			
		Environment -Nil			
		Quality – i)Maintain a record of every inspection and shall sign every entry made therein.	i)At shift end, maintain a record of every inspection in a bound paged book regarding the followings- a)that every warning device is in working order, b)that it is mechanically sound and in efficient working order, and c)that the lighting fixtures are in proper working order. From the report the operator of next shift will know about the status of the machine. Mention if there is any	Excavator Operator	DOCNO. WI/OPRN/07



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			leakages or malfunctioning of the machine.		
9	Maintenance and repairing	<p>OH&S – i)Endangering persons engaged for repairing</p> <p>ii)Injury by moving parts</p> <p>iii)Fall of suspended load</p> <p>iv)Fall of dippers</p>	<p>i)All repairs to a machine shall be done at a location which provides a safe place for the persons engaged in repairs.</p> <p>ii)Except for testing,trial, or adjustment, which must necessarily be done while the machine is in motion, every machine shall be shut down, and positive means taken to prevent its operation, before any repair, maintenance or lubrication is undertaken on it.</p> <p>iii)Any machinery or part thereof which is suspended or held apart by use of slings, hoists, or jacks shall be substantially blocked, before men are permitted to work underneath or between the same.</p> <p>iv)Excavator dippers shall be lowered to the ground during greasing operations.</p>	<p>Mechanical Engineer/ Shift Incharge</p> <p>Mechanic/Fitter</p> <p>Mechanic/Fitter</p> <p>Mechanic/Fitter</p>	<p>DOCNO. HIRA/MINING/08</p>
		Environment -Nil			
		<p>Quality – i)Examination of excavator shall be carried out in every shift</p> <p>ii)Maintenance carried out shall</p>	<p>i)Every equipment shall be thoroughly examined at least once in every shift and maintained in good and safe working condition.</p> <p>ii)A record of examination and maintenance carried out shall be</p>	<p>Mechanical Engineer</p> <p>Mechanical Engineer</p>	<p>DOCNO. WI/OPRN/07</p>



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		<p>be recorded in a bound paged book.</p> <p>iii)Reported defect will be attended on priority basis.</p> <p>iv)Stability test shall be conducted in every year.</p> <p>v)Licensee mechanics/fitters only take test run of HEMMs.</p>	<p>maintained in a bound paged register and shall be signed by the concerned shift engineer and countersigned by the Engineer-in-charge.</p> <p>iii)Any defect in any machinery, reported by operator, shall be promptly attended.</p> <p>iv)The stability of HEMM shall be carried out st least once in every year and after every major overhaul by an independent agency.</p> <p>v)Only such fitters/mechanics possessing driver's/operator's license, shall be allowed to carry out test-run of HEMMS.</p>	<p>Mechanic/Fitter</p> <p>Mechanical Engineer</p> <p>Mechanical Engineer</p>	
10	General Instructions	<p>OH&S –</p> <p>i)Electrocution</p> <p>ii)Electrocution</p> <p>iii)Operating uncontrol</p> <p>Environment -</p> <p>i)Air pollution(smoke) due to fire</p>	<p>i)Do not operate the excavator in a position where any part of the excavator or suspended loads brought closer than 3 meters to exposed high voltage lines unless current has been cut off from the line.</p> <p>ii)At any haul road in the mines over head cable will not pass below 12m. height.</p> <p>iii)Do not operate the excavator in intoxication condition</p> <p>i)Do not allow smoking or naked lights during re-fueling and checking of</p>	<p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p> <p>Excavator Operator</p>	<p>DOCNO. HIRA/MINING/08</p> <p>Aspect No.17</p>



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			batteries.		
	Quality –				
	i)Operation		i)Do not leave the excavator unattended, while it is in running condition.	Excavator Operator	DOCNO. WI/OPRN/07
	ii)Fueling		ii)The excavator shall not be fueled, while it is in running condition.	Excavator Operator	
	iii)While operating at dumping yard		iii)Whenever operating in dumping yards , follow the directions of the spotter.	Excavator Operator	
	iv)Do not use cell phone.		iv)Do not use cell phone while operating the machine.	Excavator Operator	
	v)Use PPEs.		v)Every person working in the mine shall use a helmet and protective foot wear .	Excavator Operator	
	vi)Use fluorescent jackets		vi)All the persons employed beyond day-light hours shall use fluorescent jackets and helmet with fluorescent band.	Excavator Operator	

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Name Designation Signature: Date:	Prepared by M.K. Samal Mines Manager	Approved by S. Patni Sr.GM-SCM
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NOTE :**SIX DIRECTIONAL HAZARD IDENTIFICATION DURING JOB :**

In addition to the above SOP, a 6-directional hazard identification sheet shall be used before start of the job. While executing the job at site, any hazards from six directions (**NORTH, SOUTH, EAST, WEST, TOP, BUTTOM**) to be assessed based on physical observation, common sense & experience. Controls shall be taken for any hazards thus identified.

TRAINING RECORD OF SOP :

The Training on this SOP with six directional hazards is to be imparted to concerned employee and contract workers by Shift In-Charge / Deptt. Head as applicable. The Training Record to be maintained in a register with signature of the individual employees before starting of the job.