



STANDARD OPERATING PROCEDURE
FORM NO.HSE/CORP/4

ACTIVITY	Drilling Operation			SITE	SMC	DEPARTMENT	Mining
SOP NO.	IMFA/SOP/SMC/MINING/01	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 / Refere
1	Pre start checking	OH&S – i)Fall	i)Keep the ladders and handrails free from oil, grease and dirt(slippery condition) .	Drill Operator	DOCNO. HIRA/MINING/01
		Environment – i)Air pollution(smoke) due to fire	i-a)Remove cotton waste and extraneous material from the cabin. b)Check that Battery box / Fire prone area are free from Inflammable material.	Drill Operator	Aspect No.31
		ii)Dust	ii)Check the drill bit whether sharpening required or not.	Drill Operator	
		Quality – i)Check the machine before starting.	i)Check the following before starting the machine: a) Water level in the radiator b) Hydraulic oil level (> low level) c)Engine oil level (> low level) d)Rock drill oil level (> low level) e) Compressor oil (> low level) f) Safety devices g)All lights in working condition or not h)Water level at water tank i)General visual inspection j) Clearance around the drill	Drill Operator	DOC.NO. WI/OPRN/01
ii)Check the drill bit	ii)Sharp edge drill bit gives more penetration rate so check bit condition, iii)Check for any broken parts in the drilling rig, if found report immediately.	Drill Operator Drill Operator			



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		iii)Visually check for any machine damage			
2	Use PPEs.	OH&S – i)Injury to body parts/ inhalation of dust/hearing loss	i)Use the helmet,safety shoe,safety goggle,hand gloves,nose mask, earmuff and fluorescent jacket in right way.	Drill Operator/ Helper/Supervisor	DOCNO. HIRA/MINING/01
		Environment-Nil			
		Quality – Use of PPEs.	i)Ensure that drilling crew are using PPEs.	Mines Foreman	DOC.NO. WI/OPRN/01
3.	Check after start	OH&S –Nil			
		Environment - Nil			
		Quality – i)Check after starting the machine.	i)Check the following after starting the machine: a)Engine oil pressure shall not be less than 2 Kg/Sq. cm b)Operation pressure shall not be less than 8 Kg/Sq.cm c)During flushing, air pressure shall not be less than 6 Kg./Sq. cm. d)Compressor oil pressure shall not be less than 2.5 Kg/Sq.cm e)Water temp. (in case of diesel drill) f) Air intake temperature meter. g)All monitors in panel board are in working condition. In the event of any	Drill Operator	DOC.NO. WI/OPRN/01



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			<p>defect found report to the Shift-in-charge.</p> <p>ii)Ensure the working order of water flushing arrangement.</p>		
4.	Marching & Placement on drill marking	<p>OH&S -</p> <p>i)Injury due to fall</p> <p>ii)Tipping</p> <p>iii)Toppling down the edge</p> <p>iv)Slip and fall</p>	<p>i)Do not allow any one to ride on the drill rig when tramping or towing it.</p> <p>ii-a)Be sure that the foot piece is raised clear of the ground or any obstructions before moving the beam or drill guide. Take care for uneven or sloping ground.</p> <p>b)Place the drill guide in the horizontal position before tramping or towing the drilling rig.</p> <p>iii)Look out the area clearly and adjust the travel of drill rig as per site specific needs. Be careful during movement near bench edge.</p> <p>iv)Identify any slippery condition in the work area, if found then make necessary precaution.</p>	<p>Drill Operator</p> <p>Drill Operator</p> <p>Drill Operator</p> <p>Drill Operator</p>	<p>DOCNO. HIRA/MINING/01</p> <p>DOC.NO. WI/OPRN/01</p>
		<p>Environment - Nil</p>			
	Quality –	<p>i)Marching and placement of drilling machine</p>	<p>i)Move the drill to the marking given by the blasting incharge. By seeing the level indicator, level the</p>	<p>Drill Operator</p>	



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			drill machine using the jacks provided		
5	Start the drilling	<p>OH&S-</p> <p>i) Caught between</p> <p>ii) Fall of boulder material</p> <p>iii) Flying of chips from collaring</p> <p>iv) Caught between the moving parts</p> <p>v) Eye injury during flushing</p> <p>vi) Caught between the moving parts</p> <p>vii) Hitting of drill rig/broken material</p> <p>viii) Fall from height</p> <p>ix) Fall of broken edge from</p>	<p>i) Keep yourself away from the rotating elements.</p> <p>ii) Drilling and other operation shall not be carried on simultaneously on the benches at places directly one above the other.</p> <p>iii) Do not allow the work persons in the vicinity of drill while collaring is going on.</p> <p>iv) Do not wear loose clothing.</p> <p>v) No person shall stay near the machine without wearing safety goggles while flushing of hole is being carried on.</p> <p>vi) Never to attach rod couplings or bits to a rotating part of drill rig.</p> <p>vii) No persons are allowed to remain for any cause at the place which is just below the bench where drilling is operated.</p> <p>viii) No person will be exposed to the edge while drill machine is operated. If drill rod to be changed, use safety belt</p> <p>ix) Before putting the machine to drill hole at the toe, a competent person will inspect and declare the site safe for drilling.</p>	<p>Drill Helper</p> <p>Mines Foreman</p> <p>Drill Operator</p> <p>Drill Operator/Helper</p> <p>Drill Operator/Mines Foreman</p> <p>Drill Helper</p> <p>Mines Foreman</p> <p>Mines Foreman</p> <p>Mines Foreman</p>	<p>DOCNO. HIRA/MINING/01</p>



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		<p>high wall</p> <p>x)Drill bit contact to misfire/socket</p>	<p>x)For dealing with socket or misfire hole, the relieving hole is to be drilled in the same direction and at least 1meter distance from that hole. The hole should be drilled preferably in the presence of blaster who had charged the face.</p>	Blaster	
		<p>Environment-</p> <p>i)Dust</p> <p>ii)Noise</p>	<p>i)No dry drilling will be allowed.</p> <p>ii)While approaching the drilling area , the work person and persons in the supervision will use ear muff.</p>	<p>Drill Operator</p> <p>Shift Incharge</p>	<p>Aspect No.6</p> <p>Aspect No.7</p>
		<p>Quality-</p> <p>i)Authorised person will operate the machine.</p> <p>ii)Start drilling operation</p>	<p>i)The operator will not allow any un-authorized person to operate the machine.</p> <p>ii)Lower down the rotary head attachment till bit touches ground. Give feed, rotation & operate water pump.</p>	<p>Drill Operator</p> <p>Drill Operator</p>	<p>DOC.NO. WI/OPRN/01</p>
6	Changing of drill rod(Rod attachment & detachment)	<p>OH&S-</p> <p>i)Fall of suspended tools</p> <p>ii)Throw of spanner during coupling-decoupling</p>	<p>i)Do not allow any person under suspended tools.</p> <p>ii)Proper size of spanner shall be used to hold back the column of drill rod tightly. Defective tools will not be used in the process.</p>	<p>Drill Operator/ Drill Helper</p> <p>Drill Operator/ Drill Helper</p>	<p>DOCNO. HIRA/MINING/01</p>



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		<p>Environment- i)Contamination of soil due to spillage of grease</p>	<p>i)Ensure that there is no spillage of grease during rod joining.</p>	Drill Operator	Aspect No.16
		<p>Quality- i)Changing of drill rod</p>	<p>i)<u>Rod attachment:</u> a)After spanner holds the first rod , open the rotary head from the adapter of 1st rod .Rotary head is moved to the top. Rod carrier is brought just below the rotary head & rotary head is attached to the 2nd rod.2nd rod is taken out from the rod carrier & by lowering down both the rods are joined. Apply grease while joining of rods.</p> <p>b)<u>Rod ditachment:</u> De-thread the 2nd rod from 1st rod then place the rod in its casing and ensure proper locking of rod with rod carrier. Detached the rotary head from 2nd rod. Lower the rotary head safely & joint the 1st rod with it .</p>	Drill Operator	DOC.NO. WI/OPRN/01
7	Covering of holes	<p>OH&S - i)Injury due to fall</p>	<p>i)Plug the hole after drilling to avoid stepping unknowingly.</p>	Blasting Foreman	DOCNO. HIRA/MINING/01
		<p>Environment-Nil</p>			
		<p>Quality- i)Precaution for the drill hole</p>	<p>i)Plug the hole to prevent damage of collar & fall of foreign material inside the drilled hole.</p>	Blasting Foreman	DOC.NO. WI/OPRN/01



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8	In case of any breakdown or operational difficulty	OH&S -Nil			
		Environment- i)Contamination of soil due to oil spill	i)Arrest the leakages immediately.	Drill Operator	Aspect No.16
		Quality- i)B/D intimation ii)Emergency	i)Any breakdown or operational difficulty will be informed immediately to the supervisor. ii)Know the operation of fire extinguisher.	Drill Operator Drill Operator	DOC.NO. WI/OPRN/01

9	Bit Grinding	OH&S - i)Eye injury	i)Use safety goggles while grinding the bit.	Drill Operator/ Drill Helper	DOCNO. HIRA/MINING/01
		Environment--Nil			
		Quality- i)Grinding of drill bit	i)Place the grinding table near the receiver tank of drill machine Fill 05 to 10 drops of rock drill oil in the	Drill Operator/ Drill Helper	DOC.NO. WI/OPRN/01



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			<p>grinding tool .Connect one end of the air hose to the nipple provided at the main air line and the other end to the grinding tool . Place the bit to be grinded vertically in the groove in the grinding table. Fix the grinding stone on the grinding tool. Open the valve at the main air line. First start the grinding of carsets/buttons .Check the angle of the carsets/buttons intermittently with the help of templates. When the angle comes to 110 degree grinding is complete.</p>		
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10	Bit detachment & attachment	<p>OH&S - i)Injury due to fall of hammer</p>	i)Handle the hammer carefully.	Drill Helper	DOCNO. HIRA/MINING/01
		<p>Environment-Nil</p>			
		<p>Quality- i)Detaching or attaching the drill bit</p>	<p>i)(a)Remove the centraliser. Place the bit chuck in its position. Place the chain spanner. Bolt one end of the chain spanner to the break out wrench and connect the other end to the wire sleeve of the drill. Open the break out wrench. Bit should get loosened by two/three pitch. If the chain spanner slips at the grip then tighten the adjusting bolt of the chain spanner and/or give a packing .Give reverse rotation to the rotary The bit will open.</p> <p>b)Place the bit on the bit detaching chuck and the bit retaining rings on the</p>	Drill Operator/ Drill Helper	DOC.NO. WI/OPRN/01



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			shank of the bit. Place the centralizer over the bit. Bring the DHD-Rod-Rotary assembly to the bit and give forward rotation. Raise the rotary system and remove the bit detaching chuck.		
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11	Hammer changing	OH&S - i)Injury due to fall of hammer	i)Handle the hammer carefully so that it will not fall.	Drill Helper	DOCNO. HIRA/MINING/01
		Environment-Nil			
		Quality- i)Changing of hammer	i)Hold the hammer by spanner. Give reverse rotation. The hammer will open. With the help of winch motor, utility rope is brought down with the cap & fitted to the hammer. Remove the spanner & take out or fit the hammer.	Drill Operator/ Drill Helper	DOC.NO. WI/OPRN/01

12	Parking	OH&S - i)Striking by other equipment	i)Pick the safest place for parking so that will not obstruct the other work equipment or hauling operation in that road.	Drill Operator	DOCNO. HIRA/MINING/01
		Environment-Nil			



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		Quality- i)Placing of Machine before blasting	i)Keep the drill unit at a place and in a direction so that the blasted projectiles will not affect it.	Drill Operator	DOC.NO. WI/OPRN/01
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13	Switch off the machine	OH&S -Nil			
		Environment- i)Consumption of natural resources(diesel & power)	i) Switch off lights,fans,AC when m/c is not in use,	Drill Operator	Aspect No.33
		Quality- i)Switch off the machine when not in use	i)When not in use, move the machine out the face, lower the mast & keep in the guide and park on a level ground, Keep idle for a few minutes & switch off ignition key . Then close and lock the cabin. Cutoff power from cutoff switch.	Drill Operator	DOC.NO. WI/OPRN/01

14	Reading and writing of Log Book	OH&S -Nil			
		Environment-Nil			
		Quality- i)Read machine Log Book. ii)Write Log Book regularly	i)At the beginning of shift, read the status of machine in the Log Book. ii)At the end of shift write the status of machine in the Log Book.	Drill Operator	DOC.NO. WI/OPRN/01

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Name Designation Signature: Date:	Prepared by M.K. Samal Mines Manager	Approved by S. Patni Sr. GM(Mines)
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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.