RELIANCE

Accident Investigation Report (AIR)

Division: Mining | Project: Coal Mine | Package: SPL Coal Mine

Date: 28.01.2015 Basic Cause : RD-16 while in the process of turning(west to east), the Dual Cab Utility rammed into the Dumper and as a result the Utility Vehicle was entrapped between front and rear wheels of the right side of the Dumper and as a consequence the Dumper passed over the entrapped Dual Cab.

Ref FIR No: NIL | Occur Date: 12.1.2015 | Approved Date: 28.1.2015

Type of Accident: **Fatal** / Lost Time / **Injury – Major** / Injury – Minor

Brief Description of Accident / Incident:

EVENTS PRIOR TO ACCIDENT:

At Moher OC project, mining operations are carried out via three shifts i.e. First, Second & Third Shifts. (b) (6)

On 12/01/2015 in (b) (6) (b) (6) were the Shift Incharge and OB incharge respectively. (b) (6) (b) (6), was allocated Shovel no. 2 at 390 RL, which was engaged in OB removal - dragline bench in South Pit. Six nos. of Dumpers were allocated to Shovel 02.

Shovel no. 5 was operating at a OB bench 416 RL. Both the benches were connected via a common ramp. All the loaded OB dumpers from Shovel No. 2 & 5 were dumping at Baiga dump via Hill-side road.

One Cable Tractor is deployed at every shovel for cable handling purpose. The cable Tractor of Shovel-2 was under breakdown condition and stationed near the shovel since first shift on 12/1/2015. (b) (6) was Light Machine Vehicle (LMV) maintenance Incharge in General shift. He asigned LMV maintenance team comprising of 3 persons to travel by tata-xenon-05 Dual Cab Utility (LMV) to shovel no.2 area for repair of cable tractor which was in break down mode.

Shovel No. 2 had been loading six allocated Dumpers from the beginning of the shift. At 4:00 PM, Shovel no.2 operator reported an electrical fault and put machine under break down.

TDS room is manned 24X7 by qualified engineers at Admin Office and is utilized for real time monitoring and allocation of Dumpers to Shovels and their respective dumps but it doesn't have facility to monitor the movement of light vehicles. TDS Officer can see the real time position of

every heavy equipment on his screen. TDS Officer passes on instructions through text message to the Dumpers, Dozers & Shovels for optimum utilization of machines. Operators of these heavy equipments can also send messages to the TDS Officer. (b) (6) was Incharge of TDS in (b) (6) 12.1.2015.

CAT Dumpers deployed at the mine are of 240 Tonne capacity and the Operator's cabin is on the left hand side. The dumpers are equiped with rear view camera, left hand side mirror, right hand side mirror and machine boarding ladder mirror for having clear view for the operator sitting in the Operator's Cabin in the rear, left, right & front respectively around the dumper. The Dumper Operator cannot see through the right hand side mirror beyond six metre in the right hand direction from the edge of the dumper. The Dumper Operator, while the dumper is turning, cannot see any approaching vehicles from behind. (b) (6) was allocated Dumper number RD-16 by (b) (6) Incharge (b) (6) . He had completed 2 loads from shovel#2. (b) (6) deployed for supervision at Shovel no. 2. The Shovel no.2 went into breakdown mode due to a dipper trip motor fault at about 4:00 pm. At 4:10 pm in the evening, RD-16 operated by (b) (6) reached Shovel no. 2 loading point after unloading his second load. Five dumpers were already waiting at SH-2 loading point. RD-16 was sixth (last) dumper in the queue. He received the message from TDS that SH-2 was under breakdown and he had to relocate to SH-5 which was on upper bench.

Time of Accident:

The LMV maintenance team was traveling to Shovel no.2 loading area in the LMV Dual Cab Utility for the maintenance of the cable tractor which was in break down mode. Six dumpers were waiting in queue on the western side of the bench. While approaching the cable tractor, the LMV Dual Cab Utility entered the shovel area from the eastern side. At about 130 metres behind the breakdown tractor, the last dumper in the queue, RD-16 dumper, started moving forward turning immediately right to relocate from shovel 2 area to shovel 5 area after receiving the message from TDS instructing him to relocate from SH-2 to SH-5 area. RD-16 while in the process of turning(west to east), the Dual Cab Utility rammed into the Dumper and as a result the Utility Vehicle was entrapped between front and rear wheels of the right side of the Dumper and as a consequence the Dumper passed over the entrapped Dual Cab.

Events after the Accident:

On receiving telephonic information from (b) (6) (Shift In-charge of 2nd Shift) about an accident near shovel no. 2 area, (b) (6) along with the Mine (b) (6) immediately rushed to the accident site. Meanwhile the Mine Ambulance driver was also instructed to travel urgently to shovel no. 2 area. (b) (6) was informed regarding the accident.

As per the enquiry statements, if the driver of the LMV Dual Cab Utility had been following the Mine Traffic Rules they would not have entered into the HEMM operational area without first seeking the approval of the Face Overman in charge of the work area who would have ensured

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that in fact it was safe to do so.

Job Details: The three persons in LMV Dual Cab Utility were going to shovel no.2 work area for maintenance of the Cable Tractor.

Current Health status of the Injured : Two persons, (b) (6) Prajapati succumbed to their fatal injuries. The third person, (b) (6) suffered right ankle injury and has returned home after medical treatment.

Sketch of the location of the incident :

Sketch of location of accident is enclosed in PDF format.

Accident Plan of the site:

Accident plan of the site is enclosed in PDF format.

Details of the persons died/Injured

Name of the persons died:

(b) (6)

Name of Person Injured:

(b) (6)

Package In Charge(Reliance): (b) (6)
Package Engineer (Reliance):

Witness Details :

(b) (6)

Location Details: IN coal mine OB bench Shovel no-2 loading area operating on 390RL South Pit

Parameters Observed at site at the time of accident:

1. The LMV Dual Cab Utility driver wrongly entered in the HEMM operational area of Shovel no.2.
2. Mine traffic rule specifies the speed limit and Right of way for each vehicle, which the

LMV Dual Cab Utility driver should have followed.

3. All LMV Vehicles should wait until all types of heavier equipments cross that area. When there is no movement of any vehicle in sight, then only light vehicles should enter & move inside particular area of mine. It is a pre-requisite that all LMV drivers must be authorized to drive within the Mine.
4. The Dumper Operator should have ensured clearance through the right hand mirror before turning and be more vigilant while moving to the right.
5. The LMV maintenance team should have given prior information to the Shift Incharge and subsequently to the Face Overman about the movement of LMV maintenance team in Sh-2 area.
6. Overman present at the face should have co-ordinated movement of Dumpers from the loading point of Break-down shovel no-2 to Shovel no.-5.

Immediate Actions Taken:

Rescue & Recovery:

On reaching the site it was observed that LMV Dual Cab Utility vehicle was in a crushed condition and 3 persons of LMV maintenance team were trapped inside the LMV Dual Cab Utility. Immediately, a welding truck was called to cut the light vehicle to allow the recovery of the 3 persons trapped inside the LMV Dual Cab Utility. Out of 3 persons trapped inside the light vehicle, one (b) (6) sitting on the rear of LMV Dual Cab Utility was recovered at 4:45 PM & sent to Nehru Hospital by one ambulance which reached at 5:30 PM. (b) (6) (b) (6) sitting in the front passenger seat of LMV Dual Cab Utility was recovered next at 5:15 PM. He was unconscious & critically injured, he was shifted with the help of another ambulance to Nehru Hospital which reached at 6:15 PM. (b) (6), LMV Dual Cab Utility driver was recovered next at 5:30 PM who was unconscious & critically injured, he was shifted with the help of third ambulance to Nehru Hospital which reached at 8:00 PM.

The reason of delay in shifting (b) (6) was a road blockage at TH-4 area by the local villagers. The recovery work finished at 5:30 PM. After that the complete accident area was cordoned off using safety cones & caution tapes.

(b) (6)

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Past History if any: (Activities on the day of the incident in sequence)

12/1/2015

14:00 hrs

(b) (6) started. Shift Incharge (b) (6) allocated Dumpers for different shovels in OB and coal.

16:00 hrs

The Sh-2 got breakdown. (b) (6) sent the LMV maintenance team consisting of three persons by LMV Dual Cab Utility to Shovel-2 area for repair of Cable tractor stationed at shovel no.2

16:10 hrs

RD-16 dumper was asked by the TDS Incharge to move to SH-5 from SH-2

16:15 hrs

RD-16 dumper, started moving forward turning immediately right to relocate from shovel 2 area to shovel 5 area after receiving the message from TDS instructing him to relocate from SH-2 to SH-5 area. RD-16 while in the process of turning right (west to east), was impacted by the LMV Dual Cab Utility travelling beside RD-16 which collided with the right side of RD-16 dumper between front and rear wheels of the dumper near the fuel tank and as a direct result the right hand rear wheel of the dumper passed over the entrapped Dual Cab Utility.

Following facts were inferred out of the statements taken from the witness, site engineers, site supervisors and package engineers during the investigation process.

As per the enquiry statements, LMV Dual Cab Utility vehicle should not have entered into the HEMM operational area & followed the prevailing Mine traffic rules.

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Probable Immediate Causes:

1. The LMV Dual Cab Utility driver wrongly entered in the HEMM operational area of Shovel no.2.
2. Mine traffic rule specifies the speed limit and Right of way for each vehicle, which the LMV Dual Cab Utility driver should have followed.
3. All LMV Vehicles should wait until all types of heavier equipments cross that area. When there is no movement of any vehicle in sight, then only light vehicles should enter & move inside particular area of mine. It is a pre-requisite that all LMV drivers must be authorized to drive within the Mine.
4. The Dumper Operator should have ensured clearance through the right hand mirror before turning and be more vigilant while moving to the right.
5. The LMV maintenance Incharge should have given prior information to the Shift Incharge and subsequently to the Face Overman about the movement of LMV

maintenance team in Sh-2 area.

6. Overman present at the face should have co-ordinated movement of Dumpers from the loading point of Break-down shovel no-2 to Shovel no.-5.

Root Cause Analysis:

Supervision: Overman present at the face should have co-ordinated movement of Dumpers from the loading point of Break-down shovel no-2 to Shovel no.-5. The LMV Maintenance Incharge should have given prior information to the Shift Incharge and subsequently to the Face Overman about the movement of LMV maintenance team in Sh-2 area.

LMV Drivers abiding by Mine Traffic Rule: The LMV driver wrongly entered in the HEMM operational area of Shovel no.2. Mine traffic rule specifies the speed limit and Right of way for each vehicle, which the LMV driver should have followed.

Dumper Operators to be more cautious: The Dumper Operator should have ensured clearance through the right hand mirror before turning and be vigilant while moving to the right.

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Recommended Corrective Actions to prevent such incidents in future:

Part A

The following actions shall be implemented immediately and all persons on the site shall be made aware through shift meetings and training of these actions. Completion by the 31st January 2015

1. Reinforcing that -No Vehicle movement shall be permitted in the Mine area unless the person driving the vehicle is authorized for driving it.
2. Reinforcing that -No LMV should be permitted to move in the mine unless fitted with a red flag and driven in the provided LMV lane.
3. Reinforcing that -No LMV should enter the loading area of an operating Shovel. The Face Overman shall designate a point at every shovel where no LMV should go beyond, such a point shall be located before the Shovel Field Switch. No LMV should travel beyond this point unless he takes permission from Overman and Shovel Operator.
4. Reinforcing that -Maintenance personnel moving in the mine have to give prior information to the Shift Incharge with the purpose and location of the job and obtain permission for the same.
5. Reinforcing that -Mine traffic rule specifies the speed limit and Right of way for each vehicle, which the every vehicle in the mine will have to follow.
6. Reinforcing that -The LMV Vehicles have to wait till all types of heavier equipments cross that area. When there is no movement of any vehicle in sight, then only LMV can move in that particular area of mine.
7. Reinforcing that -Mechanical maintenance team engaged in field equipments (Shovel & Drill) maintenance should be separately identified from Maintenance team of all the other equipments. The Mechanical maintenance team of the other equipments to be identified as "Workshop personnel" & they should mark their attendance in Form-E under The Mines Rule 1955, Rule no.78. Whenever these persons have to go in the mine they will register their attendance in Form-D, inform the shift incharge and then move to attend breakdown of machine.
8. The [redacted] shall undergo refresher training to operate a 240 tonne dumper.
9. All current personnel working within the mine shall receive refresher training on current Mine Safety Management System including rules pertaining to traffic movement in and around the mine site.

Part B

The following actions shall be undertaken and completed by 28th February 2015

1. Once final licensing and approvals have been finalized with government departments complete the installation of walkie-talkies on all mobile equipment entering the mine site.
2. Complete training for all personnel operating, driving or working within the mine on the correct and proper use of walkie-talkie communications.

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Part C

The following actions shall be undertaken and consequence sub actions developed and implemented along with completion dates. The initial Review of systems shall be completed by 30th June 2015

1. Complete an extensive review of the Mine Safety Management System for operating a coal mine of this size and equipment base. Such review should consider world best safety standards and operating practices with consideration to bridging and implementing any gaps identified under this review.
2. Actions along with time frames shall be developed to allow implementation of any gaps identified and agreed to be implemented under this review.
3. Training shall be undertaken to all personnel working within the mine on any changes implemented to the Mine Safety Plan. This may require a training program to be established for such training.
4. The site induction program shall be updated to reflect any changes made as above to ensure all new employees are trained and competent in the use of the Mine Safety Management Plan.
5. The revised Mine Safety Management Plan must include provision for self auditing for compliance purposes and continuous improvement of safety standards being applied on site. A schedule shall be established for such auditing.
6. Complete an extensive review of the Mine Training Scheme to ensure training is being provided to a recognized world class standard for an operating coal mine of this size and equipment base. Such review should consider actions to bridge and implement any gaps identified under this review to ensure all personnel are adequately trained for the task they are performing.

Part D

The following actions shall be undertaken on an ongoing basis commencing immediately

1. The mine shall provide ongoing safety and awareness training targeting the current and revised Mine Safety Management Plan and any local or industry incident learning's. In doing so the Mine Management team shall involve and utilize the assistance of the Mine Safety Stewards.

Disciplinary actions Recommendation

Responsibility:

1. Had the (b) (6) followed Mine traffic rules, the fateful accident could have been averted and two valuable lives could have been saved.
2. The (b) (6) should have taken precaution while turning to his right by ensuring clearance through the right hand mirror. (b) (6) shall undergo retraining program to operate a 240 tonne dumper.

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Details of Enclosures:

1. Form IV A
2. Form IV B, Submitted to DGMS.
3. Accident Plan of the site.
4. Sketch of the Location of incidence.

Name & Signature of Task Force Committee:

S.No.	Name & Designation	Signature
1.	(b) (6) [redacted]	
2.		
3.		

CMSM-17

PUREWA EXPOSED

PUREWA EXPOSED

COA D R A

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118.49

Point of Impact

×408.25 ×407.17 ×396.28 ×397.14 ×397.15 ×408.85 ×331.27 ×395.04 ×391.16 ×330.86 ×389.66 ×385.80

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CMSM-17
R.L. 443.11 (M)

(METERS)	DEPTH(M)	SEAM	THICK (M)
0			
31.50	PUREWA MERGED		
36.23			(4.73)
88.64	TURRA		
104.15			(15.51)

T.D. 108.25 (M)

H#2

L SECTION : A — A1

OI

C SECTION : B — B1

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25 CM

THIS IS TO CERTIFY THAT THIS PLAN IS CORRECT

COLLIERY MANAGER
MMAE OC PROJECT

M H &M H M H X P

RELIANCE S S

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Annexure 2 - List of major accidents at Sasan power plant

Sr	Date	Location	Name of affected workers	Nature of Injury	Agency Name	Accident Brief	Root Cause of Accident	Major measures taken for future prevention	Compensation payments to affected Workers
1	11.03.2010	Chimney 1	(b)(6)	Mostly minor injuries	M/s. Gammon India (Sub-contractor to EPC Contractor)	While lifting the concrete through hoist arrangements, the slipform truss yielded by 3 meters thereby injuring the workers on the slipform.	Slip form design used in Sasan UMPP was same as standard design used in other projects in India. However, Sasan UMPP's Chimney is the widest in India while other project's Chimney are narrower.	Slipform was redesigned by Interform (slipform manufacturer of international repute) and vetted by IIT Chennai.	(a)Medical treatment arranged for all workers (b) Full wages paid for the Medical period till resuming duty.
2	28.07.2011	Internal road towards ESP-2 &3(North of Chimney-1)	(b)(6)	Fatal	M/s. Powermech (Sub-contractor to EPC Contractor)	(b)(6) r was supporting the load, which was being carried on a Hydra, by guide ropes. Hydra toppled. (b)(6) seeing the Hydra toppling ran out of the reach of the hydra however in the process slipped and fell and suffered head injury from stacked material. He was not hit by the toppled Hydra.	This was an unfateful incident. (b) slipped while avoiding the Hydra and suffered head injury from stacked material	1. Frequency of training of Hydra operators increased. 2. Removal of stacked material from roadside.	**Statutory** (a) Workman Compensation (W.C.) - (b) (b) BOCW - (b)(4) **Contractor** (c) Immediate help - (b)(4) Cash & By Cheque (b)(4)
3	19.04.2012	Westside of ESP-2	(b)(6)	Fatal	M/s. Powermech (Sub-contractor to EPC Contractor)	There was power failure before the incident. This led to discontinuity of work. During this period, entire Gang working on the header dissembled. On restoration of power supply, since High Pressure Welder had not resumed work, other team members (excluding late (b)(6)) started realigning the joined loose pipes on one end of the header by hammering, which is usual practice. Hammering led to tilting of the header. (b)(6) who was on the other side of the header and had not informed his colleagues about his location was hit by the header. The injury proved fatal for him	This was an unusual accident. (b) had not informed his colleagues about his location and was hit by a header, which tiltled due to hammering (a routine work on header)	1. Boiler header assembly to be done by holding it with chain blocks and wirerope slings in addition to brackets. 2. Extra care on work resumption following work stoppage especially at night. 3. Closer supervision at night by deploying more stewards & supervisor	**Statutory** (a) W.C. - (b)(4) (b) BOCW - (b)(4) **Contractor** (c) Immediate help - (b)(4) Cash & (b) - for funeral.
4	18.05.2012	Outside of Chimney-1 Shell	(b)(6)	Fatal	M/s. Gammon India (Sub-contractor to EPC Contractor)	(b)(6) was working with foreman on alignment of material bucket and winch at Chimney. To adjust a wire rope at the turning pulley, he moved towards Chimney unmindful of chipping work above him. Chipping debris fell on him causing him to lose balance and he fell on the ground. At the same time another concrete debris fell on the back of his head.	(b)(6) worked in haste ignoring safety norms	1. Complete barricading of work area around Chimney with access control with warning signage. 2. Providing shed over pulley at ground level	**Statutory** (a) W.C. (b)(4) Deposited in the court of Compensation Commissioner. Disbursement Order awaited (b) BOCW - Not Applicable **Contractor** (c) Immediate help (b)(4) /- Cash (d) (b)(4) by cheque in the favour of his wife.
5	13.06.2012	Cooling Tower 3A	(b)(6)	Fatal	M/s. Hammon Sriram (Sub-contractor to EPC Contractor)	(b)(6) was at a height of 11 Mtr and was about to anchor his safety belt when he received a call on his mobile. When attending the call, he lost balance and fell on the ground from 11 Mtr height.	(b)(6) ignored safety norm and attended to mobile phone while working at a height (priority given to mobile rather than anchoring safety belt)	1. Increased awareness about safety practices 2. More signages and warning signs	**Statutory** (a) W.C. - (b)(4) deposited in the court of Compensation Commissioner. Disbursement Order Awaited (b) BOCW - Not Applicable (c) (b)(4) /- paid to parents **Contractor** (d) Immediate help - (b)(4) by Cash & (b)(4) by Cheque disbursed
6	24.06.2012	Boiler 3	(b)(6)	Loss of limb	M/s. Powermech (Sub-contractor to EPC Contractor)	While lifting the bracings of Pent House, the bracings fell down from a height of 24 meters.	Improper material lifting method	Proper locking of material being lifted.	**Statutory** (a) As per agreement between parties the M/s Power Mech has paid (b)(4) /- to (b) (b)(6) **Contractor** (b)(4)
7	24.08.2012	Near Cooling tower	(b)(6)	Not covered under industrial accident. (natural death)	M/s Hammon Sriram (Sub-contractor to EPC Contractor)	The night guard was found injured and bleeding by another guard near the cooling tower. He was moved to district hospital. Where he was declared brought dead. District administration (collector & Police) have been informed. As per thepost mortem report the cause of death is due to high consumption alcohol	Over coumption of alcohol	Not a industrial accident	Paid (b)(4) as a Interim Relief. Does not fall in Preview of Industrial Accident. Hence Workmen Compensation not applicable in this case.

Annexure 2 - List of major accidents at Sasan power plant

Sr	Date	Location	Name of affected workers	Nature of Injury	Agency Name	Accident Brief	Root Cause of Accident	Major measures taken for future prevention	Compensation payments to affected Workers
8	14-Sep-12	Labour camp near Mayer bridge	(b)(6)	Fatal	M/s ITDC (Sub-contractor to EPC Contractor)	Snake bite at around 2.45AM when he was sleeping.	Snake bite	Carbolic Acid/Bootles with their Caps punctured are kept in the periphery of Entire area.	(a) W.C. -(b)(4) /- deposited in the court of Compensation Commissioner. Disbursement Order awaited (b) BOCW - Not Applicable (c) Immediate help -(b)(4) /- by Cash & (b)(4) by Cheque disbursed.
9	20-Sep-12	Preassembly yard	(b)(6)	Fatal-(b)(6) Minor Injury-(b)(6)	M/s. MK Enterprises (Sub-contractor to EPC Contractor)	The laborers were shifting pre-assembled structure by Hydra. While moving the Hydra, they failed to notice overhead 11 KV construction powerline. Boom of Hydra touched 11 KV power line and both received electric shock. Mr Santosh Pal fell unconscious but Mr Satyendra Kumar himself walked to vehicle. Both were immediately rushed to NCL hospital under the supervision of doctor at site. Unfortunately Mr Santosh Pal was declared brought dead. Mr Satyendra Kumar is out of danger and discharge in 12hrs	Electrocution as boom of Hydra touched the 11 KV powerline and both received electric shock	1. Approved construction procedures must be used. 2. Avoid routing of live conductors enroute the Hydra/Crane operations. 3. Training given to all workers on Hazard and risk involved	(b)(6) (a) W.C. - Deposited(b)(4) /- deposited in the court of Compensation Commissioner. Disbursement Order awaited (b) BOCW - Not Applicable (c) Immediate help -(b)(4) by Cash & (b)(4) by Cheque disbursed. (b)(6) During Hospitalisation complete medical expenses were borned by the M/s M K Enterprises.
10	12-Oct-12	Boiler 2	(b)(6)	Head injury	M/s. Powermech (Sub-contractor to EPC Contractor)	The worker sustained head injury when he slipped and fell down from a temporary platform made for horizontal buck stay shifting (at height of 1.5 Mtr) during pulling of welding cables. He had not anchored his lanyard of his full body safety harness.	(b)(6) worked in haste ignoring safety norms	1. Compliance of hand rail on temporary platform to be ensured. 2. Supervision to be enhanced for ensuring strict safety compliance.	(a) Complete Medical treatment expenditure borned by the M/s Power Mech (b) Full Wages paid till medical treatment paid. (c) Under Medical supervision for next 6month, wage is being paid till then. (d) Suitable job will be offered based on final medical report
11	05.01.2013	ESP#4	(b)(6)	Fatal (b)(6)	M/s IOTEP (Sub contractor to EPC)	During lifting the middle hopper, the chain link of the chain pulley block being used gave away leading to sudden swing of the hopper to the other side. This in turn caused the fall of(b)(6) from that height (6m) to the ground as he had not anchored his safety belt. Other two persons, who were at the platform inside the hopper, got hung as they had anchored their safety belts.	Improper lifting tool used for lifting	1. Effective supervision of all the critical activities to be done to ensure 100 % compliance of fall protection measures. 2. Existing procedure of alignment and fit up of hopper will be reviewed. 3.Training on proper uses of Safety harness will be done through Tool box talk .	**Statutory** (a) W.C. - Deposited(b)(4) (b) BOCW - Not Applicable **Contractor** (c) Immediate help -(b)(4) /- by Cash & (b)(4) /- by Cheque disbursed.
12	9.02.2013	CHP,Bunker Platform	(b)(6)	(b) (6)	M/s Shanga (SEPL) (Sub contractor to EPC)	The victim fell down on bunker platform from a height of 3.5 M during erection of chute weighing around 1.8 T and its alignment with tipper. He had not anchored lanyard of his harness.	Safety harness not properly hanged	1. Effective supervision of all the critical activities to be done to ensure 100 % compliance of fall protection measures. 2. Existing procedure of alignment and fit up of hopper will be reviewed. 3.Training on proper uses of Safety harness will be done through Tool box talk .	**Statutory** (a) W.C. - Deposited(b)(4) - (b) BOCW - Not Applicable **Contractor** (c) Immediate help(b)(4) /- by Cash + (b)(4) for Mother's treatment admitted at NTPC hosp &(b)(4) by Cheque disbursed.
13	10.05.2013	BTG Yard VI	(b)(6)	Fatal- (b)(6)	M/s BLR Logistic (Sub contractor to EPC)	The victim engaged in the rigging job sustained electrical burn injury due to induction effect during the shifting of BTG material in BTG Yard VI when the boom of the crane came into the proximity 132 KV live conductor. He succummed to his injuries on May 30th ,2013 at appex hospital during his treatment. Second vicitim undergone treatment at Appex Hospital at Varanasi. All medical expenses were borned by the employer and later discharged from hospital on 23rd Nov 2013.	Electrocution as boom crane touched 132 KV powerline	1. Working near live 132 KVA overhead line to be strictly avoided. 2. Work permit system to be followed. 3. Proper communication amongst the involved agencies to be ensured.	(b)(6) **Statutory** (a) W.C. -(b)(4) Deposited in the court of Compensation Commissioner Disbursement order awaited. (b) BOCW - Application is being submitted to Labour Dept and case is under process. **Contractor** (c) Immediate help -(b)(4) /- by Cash + &(b)(4) /- by Cheque disbursed.
14	25.07.2013	Road in between ESP#3 & 4	(b)(6)	Fatal - (b)(6)	M/s. Prince Engineering (O&M contractor)	The person was going to attend work in DM Plant on bicycle at 8.00pm on 25th July 2013	Fall from bicyle in nearby Open Drain	1.Covering the drains	**Statutory** (a) Workman Compensation (W.C.) -(b) (b) BOCW - Not applicable **Contractor** (c) Immediate help -(b)(4) Cash & By Cheque(b)(4)

Annexure 2 - List of major accidents at Sasan power plant

Sr	Date	Location	Name of affected workers	Nature of Injury	Agency Name	Accident Brief	Root Cause of Accident	Major measures taken for future prevention	Compensation payments to affected Workers
15	28.01.2014	TG#5	(b)(6)	Fatal	M/s IOTEP (EPC Associates)	The deceased fell down on 13 m floor while he was enaged in making arrangement of lifting activity at a height of 26 m. He was wearing PPE's including safety harness but did not anchor the lanyard of the safety harness at the time of fall. He sustained head injury and succumed to the injuries during the treatment.	Negligence and unsafe act on the part of the deceased as he did not anchor the lanyard of the safety harness during the activity.	1. Supervision of all the critical activities to be strctly ensured for improved compliance of fall protection measures. 2. Training on proper uses of Safety harness will be done through Tool box talk .	**Statutory** (a) Workman Compensation (W.C.) -Deposited (b)(4) /- at WC Office, Sidhi(MP) (b) BOCW - Not Apllicalble **Contractor** (c) Immediate help - (b)(4) Cash & By Cheque (b)(4)
16	22.04.2014	Outside plant boundary between Main plant to Township	(b)(6)	Fatal	M/s Ram Bilas Shah (Township Miantenance sub Contractor)	The deceased (b)(6) was assigned the job of cutting the tree branches beneath main plant to township feeder no.1 for which transmission line outage and permit to work was issued. After cutting the branches of two trees, when he tried to cut the branches of tree close to the other line feeder no.2 (which was in service) on his own enthusiasm and overconfidence the branch fell on the live conductor. As a result of this (b)(6) sustained severe electrical shock. He was immediately taken to Nehru Chikitsalya in Singrauli and was pronounced brought dead.	Negligence and unsafe act on the part of the deceased on his own enthusiasm and overconfidence cutting the branch near feed no.2 live conductor which was not assigned to him .	1) Superviser to ensure working of contract worker as per the permit to work issued. 2) Strick order to labour not to take up pruning of tree near live conductors 3) Work specific Safety briefing for such a critical work	**Statutory** (a) Workman Compensation (W.C.) - Deposited (b)(4) - at WC Office, Sidhi(MP) (b) BOCW - Not Apllicalble **Contractor** (c) Immediate help (b)(4) /- Cash & By Cheque (b)(4)
17	30.05.2014	Between Unit #6 and Switchyard	(b)(6)	Fatal	M/sStar Electrical (EPC Associates)	on 30th May, 2014, Mr. (b)(6) , a lineman (around 25 years of age) working under EPC Contractor's Sub-contractor (M/s Star Electrical), got electrocuted while working on a 11kV construction power pole. He unfortunately died on the spot . While detailed investigations are being conducted with regard to the cause of the accident, At the time of the unfortunate incident, an outage of the 11kV Construction power line between Unit #6 and switchyard was obtained for termination of power cable. After line was isolated, (b)(6) started working on the line. While he was carrying out termination of power cable, possibly through back feeding from DG Set the line got charged.	Back charging from DG set	1. Regular inspection to check unsafe method adopted l ke sticks for faulty switch operation 2. Open GOAB to isolate all transformer 3. Earthing of O/H conductor while working	**Statutory** (a) Workman Compensation (W.C.) - Deposited (b)(4) at WC Office, Sidhi(MP) (b) BOCW - Not Apllicalble **Contractor** (c) Immediate help - (b)(4) Cash & By Cheque (b)(4)
18	24.07.2014	Unit #6 Boiler	(b)(6)	Fatal	M/s. Powermech (Sub-contractor to EPC Contractor)	On 22nd July, 2014 (b)(6) , a Helper (around 22 years of age) working under EPC Contractor's Sub-contractor (M/s Power Mech Project Ltd) was working at a height of 40mtr with team of four members erecting air duct. When he was about to step on the beam to access on the adjacent platform, lost his balance and fell down on the piping network at 17mtr through the opening of the platform (exactly below the duct). He had not anchored the lanyard of his safety harness. He was immediately brought down by the fellow workmen working nearby and sent to the First Aid Center where he was administered first aid. After receiving first aid, he was referred to NCL Jayant for further treatment. Suddenly on 24th Jul 2014 he started vomiting and pulse rate started oscillating abnormally. Immediately doctor advised to shift him to Varanasi for treatment. He died on the way when he was moved from NCL Jayant hospital to Varanasi by Ambulance with ventilator	Negligence and unsafe act on the part of the deceased as he did not anchor the lanyard of the safety harness while moving.	1. Supervisor to ensure use of proper exit route by the labour 2. Training and enforcement on proper uses of Safety harness through Tool box talk / inspection .	**Statutory** (a) Workman Compensation (W.C.) : Deposited (b)(4) /- at WC Office, Sidhi(MP) (b) BOCW - Not Apllicalble **Contractor** (c) Immediate help - (b)(4) - Cash & By Cheque (b)(4)
19	04.09.2014	Unit #5, Mill#C , At 4m	(b)(6)	Fatal	M/s. Powermech (Sub-contractor to EPC Contractor)	on 04/09/14 a gang of 07 persons were involved in doing alignment of mono rail beam (Wt. 05MT, Length : 10m, Breadth : 0.55m, Height : 0.80m) at an elevation of approximately 14.3 m just below the 17m platform of Unit #5 Mill 5C. The monorail beam was locked with two numbers of channel supports in the east side and with the two bolts in the hanger on the west side. For doing the alignment, the channel supports were cut by using gas cutting sets. As soon as these two supports were cut ,the beam came down and rested on the 4.5m Maintenance Platform of the mills. It damaged the top handrails of separator body of the Mill 5C and hit (b)(6) (of L&T -Electrical) in the left arm (He was rushed to apex hospital at Varanasi and out of danger) and the Monorail beam crash landed on (b)(6) (b) who was standing on the edge of the 4.5m Maintenance Platform. He received multiple injuries in the lower abdomen and succumbed to his injuries on the spot of the accident.	1. Poor Communication between the M/s Power Mech Engineer and the Fitter gang working for Mono rail beam alignment. 2. No Supervision / No responsible person was available at the work site.	Supervisor to ensure adequate communication amongst the working group members to avoid recurrence.	**Statutory** (a) Workman Compensation (W.C.) - Deposited (b)(4) /-deposited at WC Office, Sidhi(MP) (b) BOCW - Not Apllicalble **Contractor** (c) Immediate help (b)(4) /- Cash & By Cheque (b)(4)

Annexure 2 - List of major accidents at Sasan power plant

Sr	Date	Location	Name of affected workers	Nature of Injury	Agency Name	Accident Brief	Root Cause of Accident	Major measures taken for future prevention	Compensation payments to affected Workers
20	22.09.2014	Outside plant boundary in OLC	(b)(6)	Fatal		1) On night 21st/22nd Security Guard (b)(6) was on duty to safeguard the OLC from Trestle Foundation (TF) 180 to TF 150 (a distance of 600 meters). The area is susceptible for coal pilferage as the convoyer belt is very near to the ground level and very close to village Dhatura. 2) At around 0600 hrs on 22nd Sep 2014, in the course of patrolling the guard noticed two villagers very near to the conveyor belt. When he approached them and asked them to move out, there was an altercation with the guard. This action triggered of a reaction from the two individuals who were quickly supported by other villagers. Seeing the situation going out of control, the guard moved away from the village towards TF 150. Some of the villagers ran after him on foot and some followed him on the Motor Cycle. Some of the villagers were armed with agricultural tools such as small axe, sickle and stones. The guard was armed with a Double Barrel Breach loaded gun with two rounds loaded in the weapon. In the scuffle that followed between TF 150 to TF 73 (a distance of around 1500 meters, TF 73 is on the highway short of Kachan Bridge. The guard was injured on his head with severe injuries on both side of the parietal bone and left thumb. During the scuffle the weapon was fired twice(accidentally in the scuffle or in self defence could not be clearly established at this stage) as a result of which two of the villagers were injured (b)(6) of Village Dhatura was injured on his hand and taken to the Government Hospital Waidhan. (b)(6) of Village Dhatura who was injured in his stomach was evacuated on a motor cycle by his cousin brother and was taken to the hospital at Northern Coal Fields where he was pronounced dead after an hour. The guard was whisked away by one of the passers by to save him from the mob fury and taken to the First Aid Centre in the Plant. He was thereafter was admitted to NTPC, Vindhyanagar Hospital where he is still convalescing. The second villager (b)(6) (b) injured in the incident suffered minor injuries and was treated and discharged on the same day.	Accidentally in the scuffle or in self defence could not be clearly established at this stage	Security with guns has been removed. No Gun man is engaged by security.	**Statutory** (a) Workman Compensation (W.C.): NA (b) BOCW - NA **Contractor** (c) Immediate help - (b)(4) (b)(6)
21	15.12.2014	Unit #6, Boiler 41mtr	(b)(6)	Lost time (fracture)	M/s. Powermech (Sub-contractor to EPC Contractor)	On Dec 15, 2014, EPC subcontractor M/s Power Mech supervisor (b)(6) instructed (b)(6) , Rigger, along with his fellow workman to carry out pre commissioning activities (freeness of Actuator) in the air duct Dampers installed at 41 mtr in Unit #6 boiler. While work was in progress,since the link of the actuator was fouling with the cladding of duct, at about 12;45 PM his supervisor had instructed (b)(6) to bring a hammer which is required to be used to free the link from the cladding for free operation. While bringing the hammer (b)(6) entered inside the duct,from left side(towards TG side) instead of right side route to be followed for the work and fell down inside the vertical opening of air duct nearly by 5 to 6mtr and got hanging on to the horizontal bracings. He had sustained multiple injuries with suspected fracture in his left leg & left hand with the injuries in his back left side of head). Immediately he was rescued from the location - inside the duct and was rushed to the NTPC Hospital, Vindhya nagar for immediate treatment. The doctor on duty at NTPC Hospital after giving initial treatment referred him to Varanasi for further treatment. He was shifted to a hospital at Varanasi and the victim is out of danger and undergoing treatment	1.No provision of illumination. 2. No work permit taken for confined space working	1. Supervisior to ensure proper permit to work 2. Supervisor to stop safety voilations and unsafe acts	**Statutory** (a) Workman Compensation (W.C.): NA (b) BOCW - NA **Contractor** (a) Paid all treatment cost till discharge from hospital which is Aprpoximately (b)(4) (b)(4)
22	24.12.2014	Secondary Crsusher House (Mine End)	(b)(6)		M/S Franco India	On 24/12/2014, a team of 4-5 persons was given the work to position a small piece of beam to support the monorail at roof of the secondary crusher house. The person along with three other persons was positioning the beam to erect monorail with the help of rope. During this activity, the rope got untied and this person along with others fell backward and , the IP being the outermost end person , hit against a bolt causing cut injury near ear. He immediately shifted to Waidhan District hospital and from there he was taken to BHU hospital to have through treatment after CT scan. The person was operated for a blood clotting and the operation was successful. On 02/01/2015, he got expired.	Improper tying of knot for lifting	1) Ensure close supervision 2) Ensure compliance of HIRA & method statement 3) Ensure good house keeping	**Statutory** (a) Workman Compensation (W.C.): Under process (b) BOCW - Not Apllicalble **Contractor** (c) Immediate help - (b)(4)
23	12.01.2015	Coal mine	Mr. Sanjeev Shah (age 21 (b)(6)	Fatal to (b) (6)	Sasan Power Ltd	There were four dumpers waiting on the left side of the haul road near shovel 2 for loading. (b)(6) (b) driving the rear dumper no 16 (RD – 16) was waiting at the back end of all dump trucks, After getting information about break down of shovel 2, (b)(6) took a sharp right turn. 03 persons from maintenance team in the light vehicle Tata Xenon were approaching the Cable Tractor for its breakdown repair. The Tata Xenon crushed in between the front and rear tyre of RD -16 at the right side. The dumper operator stopped the dumper on feeling the jerk. This collision between dumper and light vehicle led to serious bodily injuries to all three persons in the light vehicle namely (b)(6) The victims were rescued immediately by using gas cutter and transferred to Nehru Hospital by three ambulances. In this incident out of three victims (b)(6) succumbed to death due to serious bodily injuries while (b)(6) has received fracture in right leg and rib and he is under medical treatment at Varanasi. The victims' family members have been given information about the unfortunate accident.	1. Miscommunication between Face Overman, LMV Maintenance In-charge and Shift in-charge 2. Voilation of mine traffic rule by LMV driver	1. All LMV vehicle to be provide with red flag and should not go beyond designated point 2. Maintenance person moving inside mine to give prior information to Shift incharge 3. Strict compliance of mine traffic rule	**Statutory** (a) Workman Compensation (W.C.): Deposited (b)(4) (b) BOCW - Not Apllicalble **Contractor** (c) Immediate help - (b)(4) to each family has been paid . (b)(6)

Annexure 2 - List of major accidents at Sasan power plant

Sr	Date	Location	Name of affected workers	Nature of Injury	Agency Name	Accident Brief	Root Cause of Accident	Major measures taken for future prevention	Compensation payments to affected Workers
	06.09.2015	Ash dyke	(b)(6)	Fatal (drowned in ash dyke)	Local village childrens	Four to five boys of Harrhawa village intruded inside ash pond. Of them, two boys identified as (b)(6) (age: 8-9 yrs) and (b)(6) (age: 10-11 Yrs), ventured into deep water and drowned	Act of intrusion by local childrens	1. Fencing of ash dyke area 2. Deployed additional security personals at some of the critical points to stop violation 3. Regular security surviliance	1.The humanitarian assistance that the company had agreed to provide included an ex-gratia payment o(b)(4) Lakhs (through a cheque of (b)(4) and (b) in cash) to the next of kin of each of the deceased. (b)(6)
	19.05.2016	Coal mine	(b)(6)	Fatal	M/s BIPL-KNIL JV (Earth Moving Contractor)	(b)(6) was lying under the machine draining oil from the engine into a container and then passing to (b)(6) who was tipping the oil into a drum located near the machine (b)(6) - Maintenance Helper was continuing work on the dozer repairing the tasks allocated (horn) by removing the horn from the front of the Dozer. (b)(6) has then moved to the Dozer and climbed up onto the right side of the machine (b)(6) short circuited the Dozer Starter by testing the horn on the Dozer starter switch, by placing the wires attached to the horn onto the active and position three (starting terminal) which are located on the back of the starter switch, the dozer has cranked over (4-5 secs) and then started, (b)(6) attempted to stop the Dozer engine by disabling the Blade Control, Park brake and raising the blade of the Dozer. (b)(6) has then pulled on the blade control lever, this did not stop engine and the machine has travelled forward running over (b)(6) (deceased) who was working below the machine who was critically injured and succumbed to his injury at accident site • Immediately efforts were made to revive (b)(6) ; however he has succumbed to his injuries.	This incident resulted from a number of events, instructions and failed defences occurring which caused a fatal accident.	1. Removal of Supervisor from Site 2. Implemention of Lock Out Tag Out processes across the mining operation 3. Audit training system of Contractors to ensure compliance 4. Implement Risk based systems for contractors Job Safety Analysis Training	**Statutory** (a) Workman Compensation (W.C.) (b) (b)(4) paid to his wife (b)(4) (b) BOCW - Not Apllicalble
	27.10.2016	Coal mine (NRP Gorbi End OH Line)	(b)(6)	Lost time injury (fracture)	M/s A P Associate	(b)(6) (Electrical fitter- Over Head line) of M/s A P Associate (Vendor of Over Head line maintenance) was climbing on Over Head Line pole (H-Beam) at North pit, Gorbi end for withdrawing cable and in the process of climbing the pole, he fell from a height (3m approx) due to loosing the grip of hands on the pole and injured himself. He was wearing all the PPEs such as helmet, safety shoes and safety harness for anchoring during the work	lost his grip & fell down from a height of 3mtrs.	1. Utilisation of Man-basket or Man lifter for such a jobs 2.Training to vendor & diligence	**Statutory** (a) Workman Compensation (W.C.): - NIL (b)(4)
	15.03.2017	Coal mine	(b)(6)	Lost time injury (fracture)	M/s Thriveni Earth & movers	On 15.03.2017 Tyre handler involved in tyre replacement work of M/s Thriveni Earth Movers. Attached rotation bearing bolt broken suddenly , its arm attachement got apart and fell down on the stand on which (b)(6) was standing (b)(6) got unbalance and fell down on the ground and got injured	Angluar overload of extended arm of tyre handler resulted in shearing of bolt.	1. Appropriate capacity tyre handler to be used 2. Develop detailed maintenance plan for inspection of invisible parts	**Statutory** (b)(4)
	08.06.2017	OLC	(b)(6)	Lost time injury (fracture)	M/s Sasan Power Ltd	While getting from OLC maintenance trolley with the help of foundation structure (b)(6) lost his balance due to entanglement of the lower part of his trouser with the structure bolt (Grouted into the concrete foundation) and fell down on the ground on his waist from a height of approximately 1.3 m from the top of the foundation.	Committing an unsafe act as he did not follow the safer procedure to get down instead he followed the short cut and crossed the rail	1. Foldable ladder or fixed ladder to be used for ascending & descending from the maintenance trolley. 2. Interlock to be provided for doors, to avoid any incident during the movement of the trolley 3. Identification and marking of designated boarding/landing locations.	(b)(4)

Annexure 2 - List of major accidents at Sasan power plant

Sr	Date	Location	Name of affected workers	Nature of Injury	Agency Name	Accident Brief	Root Cause of Accident	Major measures taken for future prevention	Compensation payments to affected Workers
	01.10.2017	HPH-07, Extraction Line, MOV-07	(b)(6)	Lost time injury (Blunt injury of right chest abdomen & back)	M/s Power Mech Projects Limited	The Extraction MOV dismantling was started by (b)(6) at about 6.00 pm. (b)(6) (Helper of Fitter (b)(6) of M/s Power Mech was opening the bonnet of the valve for maintenance. On loosening of the bonnet flange, the valve upper half with actuator was thrown off to a height. This happened due to sudden release of air from HP Heater No-7. Earlier in the day HP Heater was air pressurized up to 5Kg/cm2 in the shell side to check the tube leakage. After completion of the leak test, air release was started at about 4.00 pm to depressurize the heater. From the incident it is evident that, while dismantling the valve, HP Heater-7 was not fully depressurized. After loosening the valve bonnet bolts, the remaining pressure might have thrown off the Valve actuator upper half. As a result of this incident, (b)(6) sustained internal injuries in his chest and back who was immediately taken to NCL for the treatment from where the doctor on duty referred the injured after initial treatment (CT scan, making him stable) to Varanasi for further treatment.	Communication gap between two groups.	Safe maintenance practices will be developed , documented and will ensure the availability of the same to working crew.	(b)(4)
	04.10.2017	APH, Boiler#6	(b)(6)	Fatal	M/s Power Mech Projects Limited	Unit 6 overhaul activities are in progress since Sept 20, 2017. As a part of overhaul activity, in Air Pre heater, bypass seal fixing in hot end and basket door cover fixing in cold end were being carried out inside Airpre-heater at 17 meter of unit 6. On Oct 4, 2017, two groups were engaged in these jobs. Hot end bypass seal fixing job was carried out by Group 1 comprising of five workers till 02:00 Hrs. Afterwards, they all came out from the inside. In the morning at 0620 hrs, the Group 2 team, who were supposed to put basket removal door back at cold end from outside of APH, reported at site. For this activity, as the APH was started to be rotated manually at about 06:30 Hrs, a serious accident occurred (b)(6) Yrs sustained serious injuries in his abdominal area. He was immediately rushed to OHC from where he was shifted to NCL hospital. On reaching the hospital, Doctor on duty declared him brought dead. It appears that the deceased might have been struck between the sector plate and the basket of APH resulting in serious internal injury as he might have been sleeping inside APH and other coworkers are not aware about the same.	Confined Space procedure was not followed.	Strict compliance of confined space procedure to be ensured.	(b) Lac through cheque & (b)(4) cash paid on 04.10.2017 (Total (b)(4)

Sasan Mine

Investigation Report
Date: 19.05.2016
Title: Investigation Incident
BIPL-KNIL JV (Earth Moving Contractor) Employee)
Investigation # 002

Table of Contents

1 INCIDENT DETAILS

Incident Summary

At approximately 1330 Hrs. (b)(6) a Baghel Maintenance employee sustained fatal injuries after being trapped between the ground and tracks of Baghel #2 Komatsu Track Dozer, Model D65 E-12; (b)(6) a maintenance helper was repairing the horn of the machine at the time.

The incident occurred on the Overburden Dump utilised by Baghel Contracting services for placement of waste material as part of the mining process.

At 1130 Hrs the Track Dozer was parked by the Dozer Operator at the Overburden Dump in preparation for maintenance.

At 1300 Hrs three maintenance personnel had removed the engine guard and commenced draining oil from the machine.

Whilst oil draining was going on a Baghel Maintenance Supervisor instructed (b)(6) Maintenance Helper to conduct repairs to the Lights, Horn and Starter of the Dozer.

(b)(6) commenced repairs on the machine. He tested the horn, by shorting on the horn across the terminals of the engine starter switch which in turn shorted the starting circuit of the Dozer resulting in the Dozer engine starting.

Immediately following the engine starting, (b)(6) has panicked and attempted to stop the engine by:

- Raising the Safety lever for Blade control from the locked to unlocked position and;
- Raised the Dozer blade by activating the blade control and;
- Disengaging the park brake by releasing the Lever and:
- Pulling on the machine Blade Control Joystick.

The Track Dozer has then moved forward trapping the deceased between the track and the ground

Note: there is a requirement to engage forward gear selection by pushing on the left joy stick to engage forward to have the Dozer move forward. (b)(6) *in his statement states he did carry out this action. Regardless of* (b)(6) *comments in his statement the Dozer would have not moved if the gear lever was engaged in the forward position. The lever must have been engaged as the Dozer is required to be in neutral gear to start and the only explanation is* (b)(6) *in his panic to stop the Dozer has engaged the forward gear and cannot recall doing so.*

Summary of Actions to prevent recurrence

- Removal of Supervisor from the Site:
  - The Supervisor failed to provide clear direction to the employee when the employee requested assistance.
  - The Supervisor could have prevented this incident by providing assistance when requested.
- Implement Lock Out Tag Out (LOTO) processes across the mining operation.
  - Implement Isolation processes for working on equipment; too have the machine isolated prior to commencing work.
- Audit training system of Contractors to ensure compliance with requirements specified within the contract..
  - Develop an action plan to ensure competence is achieved and maintained by the contractor

- Implement Risk based systems across the site including contractors.
  - Job Safety Analysis (JSA) training and implementation

Incident

Location	Overburden Dump Area	Date	19/05/2016	Time	1330

Details of Injured

Name	Company	Injuries Sustained	Medical Treatment
(b)(6)	Baghel	Fatality	(b)(6)

Details of Damage/Impact

Equipment Involved	Damage to Equipment	Environmental Impact
Baghel Dozer #2 Komatsu Model D65E-12	Nil	Nil

Impact Rating – Consequence Level

Impact Type	Safety	Actual Severity	4	Potential Severity	4

2 INVESTIGATION

Investigation Team

Name	Position	Investigation Role
(b)(6)	Head of Safety	Lead Investigator
	Mine Manager	Team Member
	DGM Safety	Team member
	Safety Electrical Engineer	Team Member
	Safety Production mining	Team Member
	Safety Mechanical engineer	Team Member
	Mobile Maintenance Incharge	Maintenance specialist
	Technical Review of machine functional operability	Specialist

Events Leading Up to the Incident

- On 19 May 2016 at Start of Shift, Baghel Employee (b)(6) was assigned Baghel Dozer # 2. (b)(6) completed the pre-start inspection of the machine and found no defects with the machine
- (b)(6) (b)(6) (b)(6) along with a (b)(6) carried out maintenance on Excavartor-03, one Dozer and One grader
- At 1100 Hrs (b)(6) found the lights, horn and self starter for the machine was not functioning correctly and informed the maintenance Supervisor.

- (b)(6) was instructed to park the Dozer in a level, open area for maintenance to be conducted later in the day. (b)(6) parked the machine by applying the park brake, moving the throttle control to off, lowering the blade to the ground and engaging the Blade Control lever into position of hold ***(Photo 4)***
- At 1200 Hrs (b)(6) after completing work on Excavartor-03 went to the Overburden Dump face and completed maintenance on a Grader located at the dump. (changed the blade)
- Between 1200 Hrs and 1300 Hrs (b)(6) parked Dozer-02 on the Overburden in a clear flat area.
- Following completion of the Grader work on the Overburden Dump the maintenance personnel moved to the Dozer where they commenced work on the maintenance task of changing the oil in the Dozer -02
- At around 1300 Hrs (b)(6) Mechanic gave instruction to remove the drain plug from the Dozer.
- (b)(6) went below and removed the engine cover and opened the drain plug ***(Photo 3)***
- (b)(6) climbed under the machine and below the engine. ***(Photo 7)***
- (b)(6) was sitting on the track changing the oil filter
- At the same time (b)(6) Maintenance Helper opened the radiator guard and removed the horn.

Incident Description

- 1315 Hrs. (b)(6) was lying under the machine draining oil from the engine into a container and then passing to (b)(6) who was tipping the oil into a drum located near the machine.
- 1320 Hrs. (b)(6) Maintenance Helper was continuing work on the dozer repairing the tasks allocated (horn) by removing the horn from the front of the Dozer. (b)(6) has then moved to the Dozer and climbed up onto the right side of the machine.
- At around 1330 Hrs. (b)(6) short circuited the Dozer Starter by testing the horn on the Dozer starter switch, by placing the wires attached to the horn onto the active and position three (starting terminal) which are located on the back of the starter switch, the dozer has cranked over (4-5 secs) and then started, (b)(6) attempted to stop the Dozer engine by disabling the Blade Control, Park brake and raising the blade of the Dozer (b)(6) has then pulled on the blade control lever, this did not stop engine and the machine has travelled forward running over (b)(6) (deceased) who was working below the machine(***See Photo 9) who was*** critically injured and succumbed to his injury at accident site .
- The Dozer has then continued moving forward and contacted a service vehicle located 7-8 metres in front of the Dozer original position.
- (b)(6) who has observed that the Dozer has moved forward running over the deceased and was continuing in a forward direction immediately climbed onto the machine and stopped the engine by pulling the Throttle Control to stop the machine at this time it had touched a service vehicle parked at a distance of 7- 8 metres in front of the Dozer
- Immediately efforts were made to revive (b)(6) however he has succumbed to his injuries.

- At 1415 Hrs. (b)(6) along with members of SPL Senior Management Team reached incident location for emergency rescue. Local police was informed about the incident. After completion of all the formalities by Police, the body was handed over to family.
- The location was later secured by Security guards for investigation by Directorate General of Mines Safety(DGMS).
- On 20 May 2016 an Officer from DGMS visited mine and reviewed reason for the incident.

Facts found from Investigation

- (b)(6) was assigned Baghel Dozer # 2 for operation. (b)(6) completed the pre-start inspection of the machine and ***found no defects with Baghel Track Dozer #2***
- At 1100 Hrs. (b)(6) identified 3 faults with the machine (lights, horn and Self Starter)
- (b)(6) informed the Maintenance Supervisor and the repair work was scheduled for 1:00 PM on the same day
- (b)(6) Senior Mechanic instructed the personnel to change the oil on the Dozer and (b)(6) to repair the lights, horn and starting on the Dozer.
- (b)(6) Maintenance Helper was repairing the horn on the Dozer at the time of the incident
- (b)(6) Maintenance Helper during the enquiry confirmed that he was required to repair the horn of the Dozer and cannot recall being instructed to repair the lights and starting system of the machine.
- Changing the oil and checking the electrical wiring were simultaneous tasks being undertaken on the Dozer.
- The incident occurred on the Overburden Dump utilised by Baghel Contracting services for placement of waste material as part of the mining process.
- (b)(6) was sitting on the Left hand track and replacing the oil filter prior to the incident where (b)(6) was passing oil to (b)(6) which (b)(6) was draining from the Dozer.
- At around 1325 Hrs. Dozer 02 started and moved forward over (b)(6) who was below the machine and continued moving until the vehicle contacted a pick-up. The Pick-up was parked by the Maintenance Supervisor who had delivered personnel and equipment to the personnel working on the Dozer at the time. There was a minor damage to the pick-up vehicle door.

- When Dozer suddenly started by mistake, (b)(6) attempted to stop the Dozer by pulling the Blade Control Lever,/ Park Brake Lever and Blade Control Joy stick. Since he could not stop the Dozer he called for help.
- (b)(6) who noticed the Dozer moving and jumped onto the machine from the side and moved the throttle lever to the stop position, stopping the engine of the Dozer.
- (b)(6) immediately prior to the Dozer starting had tested the horn on the ignition switch which was hanging down from the dash board of the Dozer, by shorting the horn onto the Starter Switch terminals.

Findings of Machine Test of Baghel Komatsu Track Dozer # 2

The testing of the machine was delayed by obtaining relevant OEM personnel to complete the test. The site waited for Komatsu service personnel support for assessment of machine condition.

On 26 May 2016 Komatsu service personnel inspected the Baghel Komatsu Dozer #2 for operability focusing on the starting of the machine, and safety controls associated with the starting of the machine. It must be noted the Starting Switch on the Dozer was defective and "short" circuiting was required to start the machine. ***This had no impact on the functions of the machine including Park Brake and Blade Control functions***

The following tests were carried out /checked with the Komatsu Representatives in attendance

Test being undertaken	OEM Specification	Status of Dozer	Compliance to OEM Specification
Park brake in applied position	Park brake applied machine will not engage forward or reverse gear	Park brake applied machine will not engage forward or reverse gear	Compliant
Testing if starting circuit	Park brake in off position. Starter motor does not engage	Park brake in off position. Starter motor does not engage	Compliant
Starting of engine with throttle in stop position	Engine cranks over but will not start	Engine cranks over but does not start	Compliant

An email report received from Asim Roy, Head-Service Construction Equipment Business- Komatsu stated in part confirms the correct function of the Park Brake and Blade Control Lever. The same is reproduced below

We clarify that:

1. *All Komatsu equipment have the safety features built in .*
2. *The safety DO & DO NOTs are clearly mentioned at the beginning few pages on the Operator & maintenance manual supplied along with the equipment . For your reference, I attach the excerpts of the manual.*
3. *Following the safety tips & complying to safety practices rests with organization who owns the machine for it's employees & other's interest.*

We couldn't comment if LOCK out /TAG out was practiced during the incident. Our observation on the machine are as following :

i. Safety & Parking lever on RH and LH of the seat were found operational.

ii. Ignition switch was not available on the machine. Crude & non insulated wires were seen hanging dangerously. Accidental grounding can even start/stop the engine & even cause a fire hazard.

iii. Horn was not working .

With above observations we conclude our site visit.

It was found during the investigation the OEM manual makes comment that the Blade Control Safety Lever shall be engaged prior to the engine starting. The OEM representative confirmed that the manual was incorrect.

The starting switch on the Dozer had been defective from 8 May 2016.

Conclusions

This incident resulted from a number of events, instructions and failed defences occurring which caused a fatal accident.

(b)(6) was assigned to the repairs on the Dozer by (b)(6) (b)(6) was employed as a Maintenance Helper by Baghel Contracting. When site Auto Electrician was on leave, maintenance helper was assigned to carry out the repair work. He has limited experience was working as Maintenance Helper under by Baghel Contracting agency since Jan 2016 and as helper to Auto Electrician since March 2016. (b)(6) had no prior experience with work as a Maintenance Helper.

Baghel have deployed only one Auto Electrician at the mine and as a result in his absence the task of repairing the Dozer was assigned to (b)(6)

(b)(6) was not trained to operate the Dozer and the task he was assigned did not require him to operate the machine and as a result did not fall within the task scope of being trained to operate the machine.

Immediately prior to commencing the task (b)(6) had asked for advice on how to complete the task from the Maintenance Supervisor., (b)(6) has been instructed to "just do the task", as (b)(6) commented in his statement, he had taken some water from the water bottle of the Supervisor and he had became angry with him. It appears this may have clouded the Supervisors ability to make sound judgement when (b)(6) has questioned him on the task and his resultant reply.
Supervisor when questioned on this matter by S Bhoot of the investigation team denied above statement of (b)(6) Without doubt (b)(6) would have had this on his mind and may have impacted on his decision making process when testing the horn of the Dozer

(b)(6) has identified a person sitting in front of the track and has proceeded to remove the horn from the front of the machine, He has climbed onto the machine from the right side of the machine and has found that ignition switch hanging down from the dash board of the machine and commenced testing the horn by shorting the horn between the active and the start circuit on the machine, resulting in the machine starting. ***(The engine needs to crank between 3-7 seconds before engine will start)*** (b)(6) had taken the decision to test the horn at the switch as he thought it was the easiest location.

While testing the horn Dozer engine has suddenly started, (b)(6) has then panicked and attempted to stop the machine by disengaging the Blade control(first safety device) park brake(second safety device) and engaged forward gear (third safety device) and then raised the blade(with the blade down the machine may have remained in position). All of these key controls were overcome by (b)(6) to allow the machine to move forward. (b)(6) has stated he did not engage forward gear by moving the Joy stick. The machine when tested confirmed the Joy stick was operating correctly and was interlocked into neutral position when the park brake was applied. ***It was also confirmed during testing and with interview of the Dozer Operator that engine throttle must be applied to start the engine***

There was no hazard recognition by the Supervisor of the two tasks being undertaken and the possible task conflict between draining the oil and repairing the horn. Additionally when he requested assistance it was turned downed by his supervisor.

(b)(6) has not understood the potential for the shorting of the key to start the engine of the Dozer and as a result lacked the skills and knowledge to identify the potential for the machine to start when shorting the starting switch.

The Contractual arrangement between Sasan Power and BIPL-KNIL-JV of which Baghel is a partner clearly defines accountabilities and responsibilities required with relation to Competence, Training and Supervision of personnel within Section 22 (G) of the Contract *(see Appendix1)*.

Photographs

Photo 1.Showing Left Joystick: Joystick controls: (Steering, directional and gear shift levers)

Photo 2.Showing Right side Joy Stick for Blade Control

Photo 3.Machine engine covers were open on both sides of machine as part of the changing oil process

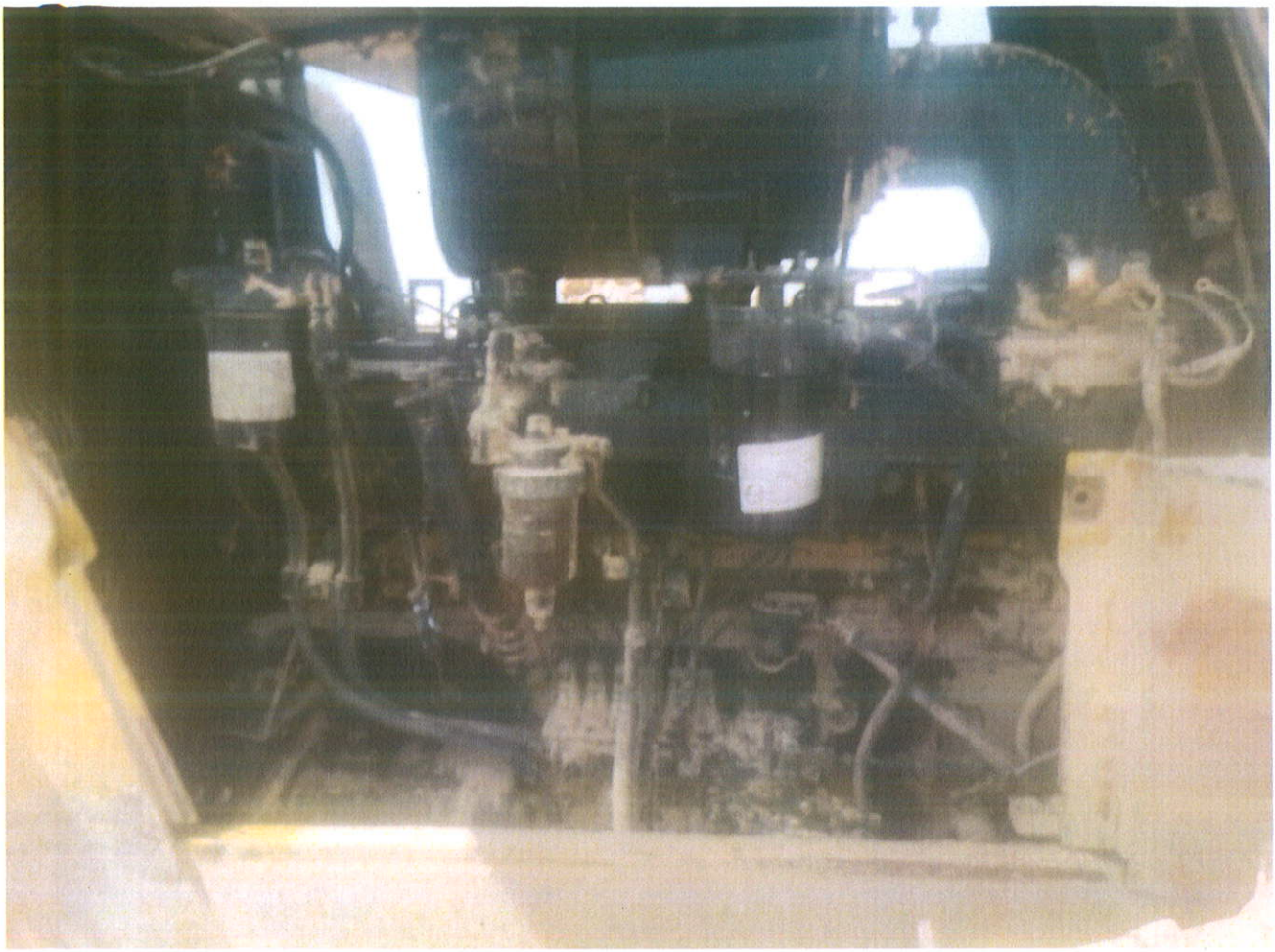


Photo 4 showing replacement Horn and tools used by Electrician, Park Brake and Blade Control Levers in ***locked position***

Photo 5 Ignition Switch removed from Dash

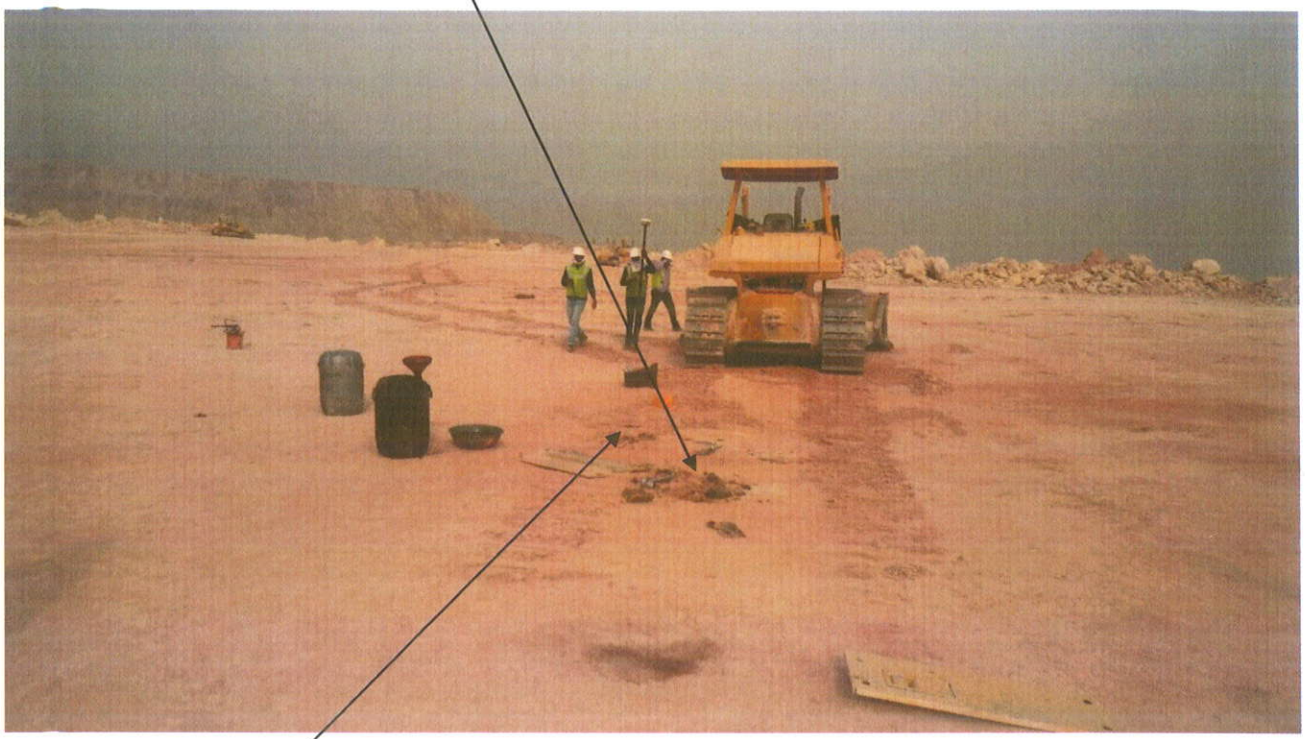
Photo 6. Showing blade marks on right side of machine (note blade marks were not continuous) indicating (b)(6) had raised and lowered the blade

Blade marks increased in depth at this position indicating blade was lowered by (b)(6)

Photo 7 Position of deceased immediately prior to incident. Deceased was lying under the machine draining oil from sump and passing to fellow employee sitting on left track . *Position of deceased lying under machine prior to incident*

Photo 8; Showing location of Dozer on waste Dump

Photo 9.Showing position of the tools



Position of deceased

Absent or Failed Defences

Defences are those factors that are designed to detect and protect the overall system from the results of human or technical failures, that is, they are the "last minute" protection measures designed to avoid or mitigate the outcome. The following defence factors are identified as being absent or failed and therefore responsible for the outcome:

Code	Type	Contributing Factor	Example
DF01	DETECTION SYSTEMS	N/A	• Signage • Warning lights • Traffic warning systems • Speed sensors
DF02	PROTECTION SYSTEMS	Protections Systems(interlocks) functioned as per OEM standards	• Bunded areas • Interlocked guards
DF03	WARNING SYSTEMS	N/A	• Signage • Warning lights • Traffic warning sirens
DF04	GUARDS OR BARRIERS	N/A	• Guards
DF05	RECOVERY	N/A	• Procedures • Protocols
DF06	ESCAPE	N/A	• Gas detectors • Safe access/exit • Emergency escape
DF07	RESCUE	N/A	• Emergency communication • Fire extinguishers • Spill response kits
DF08	SAFETY DEVICE OPERATION	Protections Systems(interlocks) functioned as per OEM standards	• Safety switches • By-pass valves • Emergency shut-down systems
DF09	PPE	N/A	• PPE • Gas detectors
DF10	HAZARD IDENTIFICATION	Supervisor did not understand the hazards of two tasks and the controls required to complete the tasks. Person repairing the horn did not understand the hazards associated with using the starter switch as a testing point for the horn	• Induction training • Ongoing training • Communication • Risk assessment • Competency • Reporting
DF11	CONTROL SYSTEMS	No Isolation Practice/Procedure by Contractor	• Procedures • Protocols • Fire extinguishing • Spill response kits

Individual or Team Actions

The following individual/team actions are the errors or violations that led directly to the event. These actions are often associated with personnel having direct contact with the equipment, such as operators or maintenance personnel. They are always committed 'actively' (someone did or didn't do something).

Code	Individual or Team Action	Contributing Factor	Example
IT01	SUPERVISION	Supervisor did not respond to the request for assistance by Employee when asked to provide direction	• Poor/ inadequate supervision • Poor supervisory example
IT02	OPERATING AUTHORITY	N/A	• Unauthorised operation of plant or equipment
IT03	OPERATING SPEED	N/A	• Operating a piece of equipment at a speed other than in its safe operating envelop. • Speed in excess of approved speed.
IT04	EQUIPMENT USE	N/A	• Equipment used incorrectly • Wrong tool used for the task • Poor practices
IT05	PPE USE	N/A	• PPE not worn • PPE not available • Wrong/unsuitable PPE worn • PPE not worn correctly

Code	Individual or Team Action	Contributing Factor	Example
IT06	PROCEDURAL COMPLIANCE	No Isolation Practice/Procedure by Contractor. Supervisor when asked for advice did not provide advice or direction	• Procedure not followed • Procedure not complied with • Rules not followed
IT07	CHANGE MANAGEMENT	N/A	• Change management not followed • Change not managed correctly • Change not recognised
IT08	EQUIPMENT/MATERIALS HANDLING	N/A	• Equipment/materials incorrectly handled
IT09	MISCONDUCT	N/A	• Wilful violation of procedures or rules
IT10	WORK METHOD	Task of testing the horn should not have been conducted on the starting circuit if the machine	• Poor work method • Wrong work method chosen
IT11	OCCUPATIONAL HYGIENE PRACTICES	N/A	• Poor practices
IT12	HAZARD RECOGNITION/ PERCEPTION	Personnel did not perceive the hazards associated with multi tasking on the same piece of equipment	• Person not aware of the hazards and risks. • Misperception of hazards
IT13	RISK MANAGEMENT	No risk management practices by contractor	• Risk assessment not complete • High risk activity not identified or managed.

Task or Environmental Condition

The following task / environmental conditions are the conditions that contributed to the event. These are the conditions in existence immediately prior or at the time of the event, and are the conditions that directly influence human and equipment performance in the workplace. These are the circumstances under which the errors and violations took place and can be embedded in task demands, the work environment, individual capabilities and human factors.

Code	Task/Environmental Condition	Contributing Factor	Example
TW01	TASK PLANNING/ PREPARATION/ MANNING	The task planning did not address the lack of competence of the person carrying out the task	• Poor planning of task • Supervisor/worker ratio • Undermanning • Poor access to job
TW02	HAZARD ANALYSIS/JOB SAFETY ANALYSIS/ BMA SAFE	No Hazard process utilised for the task	• No Take 2/5 • No JHA (JSA/THA etc) • Risk assessments inadequate • Failed to identify hazards
TW03	WORK PROCEDURES – AVAILABILITY AND SUITABILITY	No Procedure in place for the task	• No procedure for task • Inadequate procedure • Impractical or unrealistic procedure • Procedure not easily accessible or known
TW04	PERMIT TO WORK	N/A	• No permit system in place • Permit not in place • Permit not followed • Permit does not adequately cover task
TW05	ABNORMAL OPERATIONAL SITUATION OR CONDITION	N/A	• Poor man/system interface • Designer/user mismatch
TW06	TOOLS/ EQUIPMENT/ MATERIALS	N/A	• Gas detectors • Safe access/exit • Emergency escape
TW07	EQUIPMENT INTEGRITY	Starter switch was defective on the equipment	• Equipment failure • Poorly maintained
TW08	HOUSEKEEPING	N/A	• Poor housekeeping • Poor working conditions

Code	Task/Environmental Condition	Contributing Factor	Example
TW09	WEATHER CONDITIONS	N/A	• Wind, rain, flood, heat, sunlight, glare, • lightning
TW10	CONGESTIION/ RESTRICTION/ACCESS	N/A	• Confined work area • Poor access
TW11	ROUTINE/ NON ROUTINE TASK	Person completing the task was unfamiliar with the task requirements	• Unfamiliar with task • Task rarely undertaken
TW12	FIRE/ EXPLOSION	N/A	• Fire
TW13	LIGHTING	N/A	• Poor illumination • Excessive illumination
TW14	TEMPERATURE	N/A	• Hot, Cold, Humidity
TW15	NOISE	N/A	• Loud noise affecting ability to hear • Overprotection (Can't hear alarms etc.)
TW16	VENTILATIONS	N/A	• Breathing difficulties • Contamination
TW17	PRESSURE	N/A	• Pressure release • Vacuum
TW18	GAS, DUST OR FUMES	N/A	• Affecting visibility • Breathing • Contamination
TW19	RADIATION	N/A	• Non-ionizing • Ionizing
TW20	CHEMICAL	N/A	• Burns • Absorption through skin • Ingestion • Loss of control
TW21	TRAINING	(b)(6) was inexperienced and not adequately trained for the task	• Inadequate training • Training not received • Lack of training • Inexperience
TW22	WILDLIFE	N/A	• Crossing roads • Bites
TW23	SURFACE GRADIENT/ CONDITIONS	N/A	• Incline • Decline • Uneven • Rocks
TW24	GROUND STABILITY /CONDITIONS	N/A	• Faults • Anomalies • Water • Aquifer

Code	Human Factors	Contributing Factor	Example
HF01	COMPLACENY/MOTIVATION/ ATTITUDE	(b)(6) was affected by the attitude of the Supervisor when he requested assistance and was yelled at	• Poor morale, poor attitude, personal problems, overconfidence.
HF02	DRUGS/ ALCOHOL INFLUENCE	N/A	• Lack of judgment • Fatigue • Loss of control • Prescribed medication
HF03	FATIGUE	N/A	• Tired • Poor shift patterns • Overtime worked • Disturbed sleep patterns
HF04	TIME/PRODUCTIVITY PRESSURES	N/A	• Time constraints • Time pressures • Schedule pressure
HF05	PEER PRESSURE/SUPERVISORY EXAMPLE	Supervisor showed a lack of leadership and direction when assistance was requested in completing the task by (b)(6) Supervisor showed poor attitude when the employee asked for assistance	• Poor supervisory example • Age and Gender • Culture condoning violations • Learned helplessness

Code	Human Factors	Contributing Factor	Example
HF06	PHYSICAL/ MENTAL CAPABILITIES	N/A	• Person not work ready • Person not capable of understanding • False perceptions • Error proneness
HF07	PHYSICAL/ MENTAL STRESS	Anxiety for employee after receiving poor response by Supervisor to request for assistance and being instructed just to get it done	• Work stress • Performance anxiety • Inability to assess situation • Low self esteem • Medical usage
HF08	PERSONAL ISSUES	N/A	• Family problems • Relationship issues
HF09	DISTRACTION/ PRE-OCCUPATION	N/A	• Bad mood • False perceptions
HF10	COMPETENCY/ EXPERIENCES/ SKILL FOR TASK	Lacked skills and knowledge to complete the task	• Incomplete knowledge • Insufficiently ability • Inadequate skill
HF11	POOR/INADEQUTE COMMUNICATIONS	Communication of the two separate tasks on the Dozer being carried out	• Message not sent or received
HF12	TOLERANCE OF VIOLATIONS	Starter key had been defective for 14 days	• Violations tolerated • Perceived licence to bend rules • Tasks allow for short cuts
HF13	CHANGE OF ROUTINE	N/A	• Unusual activity • Non normal task

Organisational Factors

The following are the underlying organisational factors which produce the task / environmental conditions that affect performance in the workplace. They may lie dormant or undetected for a long time within the organisation with their repercussions only becoming apparent when they combine with the local conditions and errors and violations to breach the system's defences.

Code	Organisational Factors		Example
OS01	ORGANISATION	N/A	• Poorly defined departments or sections. • Unclear accountability, responsibility or delegation. • Lack of definition of objectives. • No structure to co-ordinate different activities. • Poor planning. • Excessive bureaucracy. • Frequent reorganisations.
OS03	RISK MANAGEMENT	Baghel had no formalised Risk Management processes in place	• Inadequate or poorly conducted risk management process. • Goals, objectives, scope and boundaries of risk management activity not clearly determined. • Level of risk analysis (JSA, QRA, Safety Case, etc.) inappropriate for the degree of risk or phase of lifecycle. • Hazard identification process not being systematic, or covering all operations and equipment. • Risk assessment conducted without the appropriate competencies and experience. • Inappropriate selection or poor implementation of risk control measures. • Inadequate monitoring of risk control effectiveness.
OS04	INCOMPTABLE GOALS	Supervisor when instructing (b)(6) did not consider his capability for the task	• Conflict between safe work and production priorities. • Conflict between work and personal priorities. • Imbalance between safety requirements and budge constraints. • Taking procedural short-cuts for personal/ production gain. • Conflict between appearance and functionality in a design.
OS05	TRAINING	No formalised training process in place by Baghel	• Training not directed to all the job skill requirements. • Ineffective pre-employment selection process. • Poor planning of when training is needed. • No assessment of training effectiveness. • Differing standards of training. • Training the wrong people. • Making assumptions about a person's knowledge or skills.

Code	Organisational Factors		Example
OS06	COMMUNICATION	There were two tasks scheduled for the same machine and a lack of communication between both Supervisors in task allocation	• Language problems and cultural barriers. • Lack of clear line of communication. • Poor feedback. • No standard communication format. • Missing or excessive information. • Inability to make contact with the correct person. • Unreceptive or hostile target.
OS07	DESIGN	N/A	• No standardisation of equipment or usage. • No adapting to human needs and limitations. • Poor designer-user communication. • Time or financial constraints. • No indication of system status provided by design (on/off, working or not) • Inadequate design premise data.
OS08	MANTENANCE MANAGEMENT	• Baghel have only one person employed as Auto electrician resulting in inexperienced person conducting task	• Poor planning, controlling, execution and recording of maintenance. • State of equipment not communicated to relevant people. • Shortage of specialised maintenance personnel. • Absent/inadequate manuals and documents. • Incorrect maintenance strategy.
OS09	PROCEDURES	N/A	• Poor knowledge of the procedure writer. • Poor feedback on practicality. • Poor indexing or retrieval methods. • Gaps in the inventory of procedures needed. • Non-operational objectives (political/organisational). • Failure to have revision control system.
OS10	CONTRACTOR MANAGEMENT	N/A	• Inadequate or poorly conducted contract management process. • Lack of consideration of risk associated with the contract. • Poorly defined selection criteria giving undue weight to cost over performance. • Lack of formal contractor evaluation procedure. • Lack of a clearly defined work scope. • Contract not clearly defining HSE obligations, performance and reporting requirements. • Unclear reporting relationships, lines of communication, roles and responsibilities. • The failure to identify/plan bridging requirements between the contractor and company standards. • Inadequate or poorly conducted HSE compliance and performance monitoring and review.
OS12	MANAGEMENT OF CHANGE	N/A	• Inadequate or poorly conducted management of change process. • Objectives and scope of change activity not clearly determined. • Inadequate risk vs benefit assessment of the impact of change. • Poor change implementation plan. • Poor communication of change. • Too fast or too slow implementation of change. • Inadequate tollgate mechanism to approve proposed change. • Inadequate monitoring of the effects of change to existing performance levels.
OS15	HARDWARE	N/A	• Poor stock or ordering system • Poor quality due to the local availability • Poor state of existing equipment • Equipment not fit for purpose • Lack of resource available

3 ICAM ANALYSIS CHART

- The features of the below ICAM chart for the purposes of this report are:
  - **a** To provide a graphical representation of all the key circumstances and contributing factors relating to the incident.
  - **b** To outline the relationship of the various elements considered throughout this report/

ORGANISATIONAL FACTORS	TASK/ ENVIRONMENT	TEAM/ INDIVIDUAL	ABSENT/ FAILED	Incident
Opportunity for Sasan to improve Contractor Management accountabilities and authorities by implementing improved Contractor Management Processes and Controls	Poor planning of the task by Baghel Supervisor.	Poor Supervision by Baghel Supervisor when request for assistance on task direction	Hazard awareness. Baghel Supervisor did not understand the hazards of two tasks and the controls required to complete the task. Baghel employee repairing the horn did not understand the hazards associated with using the starter switch as a testing point for the horn	Incident occurred
Baghel have only one person employed as Auto electrician resulting in inexperienced conducting task and insufficient skills and manning	Equipment(Dozer) was in a defective state	Poor work method chosen for the task due to lack of knowledge and skills		
Baghel have no formalised training process in place for managing workplace risk and competence	Baghel employee was unfamiliar with the task of repairing the Starter Switch	Hazard awareness Baghel Supervisor did not perceive risk of conducting two tasks at the same time. Baghel Person completing task did not recognise potential hazards and risks.		
Baghel have no formalised Maintenance Program or competencies established for Supervisors	N/A			
	N/A			

4 ICAM

Investigation Team

Name	Company	Position	Role	Signature
(b)(6)	Reliance Sasan Mine	HOD Safety	Lead	
	Reliance Sasan Mine	Chief Project Director	Approval	
	Reliance Sasan Mine	Project Director	Review	
	Reliance Sasan Mine	Mine Manager	Team Member	
	Reliance Sasan Mine	Manager Electrical Engineering	Team Member	
	Reliance Sasan Mine	Safety Officer	Team Member	

5 ROOT CAUSE

- (b)(6) was not competent to carry out the task of repairing the Horn on the Dozer.
- Poor Supervision in allocating tasks to inexperienced or untrained personnel without adequate Supervision.
- NO effective Isolation process/practice was utilised in this task, despite the available movement protection in place (Park Brake, Blade lock, Throttle control) all of these processes were defeated by (b)(6) allowing the Dozer to start and move.

6 KEY LEARNINGS

- (b)(6) was not competent to carry out the task of repairing the Horn on the Dozer
- Competent Supervision must be maintained with untrained personnel who are performing maintenance tasks
- Training schemes to set and assess competency are required to be developed and implemented
- The Dozer was not maintained to OEM specifications (defective key switch)
- No formalised Isolation practice conducted by the contractor on mobile equipment.

7 CORRECTIVE ACTION PLAN

- Removal of Supervisor from Site:
  - The Supervisor failed to provide clear direction to (b)(6) maintenance team member when he requested for assistance .
  - The Supervisor could have prevented this incident by providing assistance when requested.
- Implement Lock Out Tag Out processes across the mining operation.

- Implement Isolation processes for working on equipment; too have the machine isolated prior to commencing work.

- Audit training system of Contractors to ensure compliance
  - Verify Contractor is complying with requirements specified in the contract. Develop an action/audit plan to ensure competence is achieved and maintained by the contractor

- Implement Risk based systems for contractors Job Safety Analysis Training.
  - Implement risk based training for all contractor Supervisors and employees

Actions

Action	Factor being addressed	HoC	Responsible Person	Due Date	Work Request#
Remove Supervisor from Site	Organisational factors	Elimination	(b)(6) [redacted]	20/06/2016	Completed
Conduct audit of Contractors Training Systems to ensure compliance to DGMS requirements	Legal Compliance	Administration		30/06/2016	
Implement Risk Management Systems Individual JSA	Team/Individual	Administration		30/0920/16	
Implement Lock Out Tag Out process	Team/Individual	Administration		30/09/2016	

8 Report Sign-Off

Position	Name	Signature	Date
Mine Manager	(b)(6) [redacted]		25/06/2016
Project Director			25/06/2016
HOD Safety			25/06/2016
Chief Project Director			25/06/2016

Appendix

1) Extract of Contract
2) Extract of Komatsu Operation Manual for Komatsu Dozer involved in Incident
3) Statements

(b)(6)

Appendix 4 Signed Record of Test - Komatsu Track Dozer #2

Appendices

Appendix 1 Section 22 Contract Conditions

c) Potable and industrial water requirement will be met by the Contractor. If the Owner has spare availability of potable and industrial water, Owner may provide potable and industrial water required by the Contractor on mutually agreed chargeable basis.

22.COMPLIANCE WITH LAW

(a) Contractor will comply with all statutes, rules, regulation, applicable laws etc. and obtain all necessary permits, registrations and licenses required to carry out the Scope of Work at its own costs.

(b) Contractor will indemnify the Owner from any liability befalling on Owner due to any commission/ omission by Contractor or by its representative or by its employee or by any third party in execution of Contract. If the Owner is made liable for such claims by the court or any other authority, the same shall be recovered from the Contractor.

(c) During the course of execution of the Work, if any accident occurs whether major or minor, the Contractor or its supervisory staff will inform the same, immediately without any delay, to the Mines Manager to take steps in accordance with the Mines Act, 1952 and other relevant Laws.

(d) Execution of the Work with contract labour is prohibited vide notification U/s 10(1) Contract Labour (Regulation & Abolition) Act,1970. In view of this, the Contractor will execute the Work by using machines with its regular employees/workmen only.

(e) Only experienced, skilled and disciplined Vocational Training Centre (VTC) certified drivers of sound health, good behaviour and antecedents having valid driving license shall be deployed by the Contractor for driving the tipping trucks/trucks/ pay loaders/ equipment deployed for the Work.

(f) If the Owner suffers any loss on account of suspension of production or idleness of Contractor's equipment/ employees or on any other account or damage to its property, due to any failure on the part of the Contractor or due to any act of omission or commission on the part of Contractor's representative/ employees or from the trucks/ equipment of the Contractor, the value of the same as assessed by the Owner, shall be recovered from the Contractor's bill. The decision of the Owner in this regard shall be final and binding on the Contractor.

(g) The Contractor shall post adequate number of competent, experienced, skilled and disciplined persons having good antecedents for satisfactory execution of the work. A list of all such persons shall be kept in the office of the Contractor and a copy of the same shall be furnished to the Mines Manager as and when required. All these persons shall be directly employed by Contractor and under direct administrative control of the Contractor and the Owner shall have no responsibility/ liability whatsoever in this regard.

(h) The Contractor shall not engage any person of less than 18 years of age or female workmen during night hours as required by relevant law.

(i) The Contractor shall pay to its employees, salary and wages as per Law of the Labour applicable to the workmen of the colliery under this Contract.

(j) The Contractor shall make payment to its employees at the place(s) specified by the Mines Manager and in the presence of Owner representative authorized by him who shall witness all payments by the Contractor to its employees. For this purpose Contractor shall notify to the Mines Manager date and time of payment.

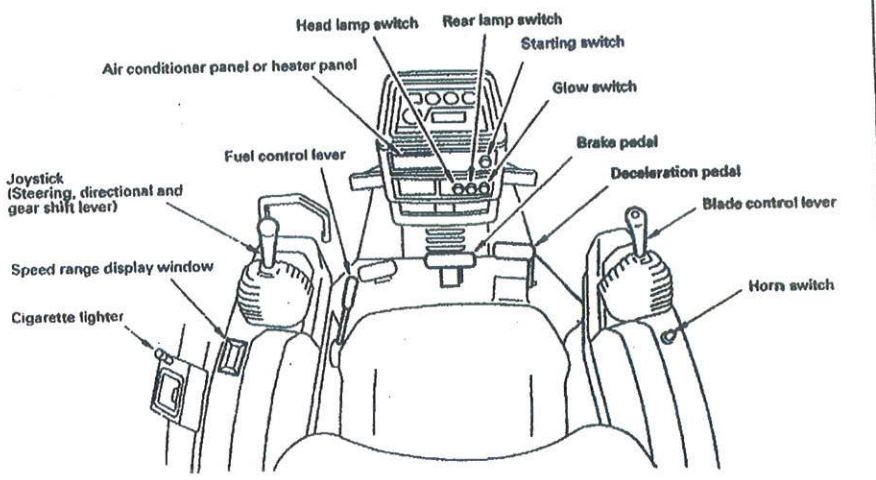
(k) The Contractor shall prepare the wages sheet for its employees in duplicate, a copy of which shall be regularly submitted to the Mines Manager.

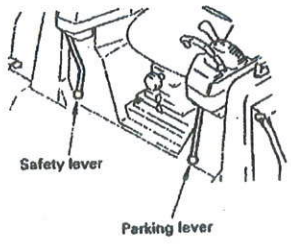
(l) The Contractor shall make necessary payment of the Provident Fund for the workmen employed by him for the work as per the laws prevailing under provisions of CMPF and Allied Schemes and Miscellaneous Provisions Act 1948 or Employees Provident Fund and Miscellaneous Provisions Act 1952 as the case may be. The Contractor shall regularly deposit the contribution in accordance with such scheme. Owner shall have no liability whatsoever in this regard.

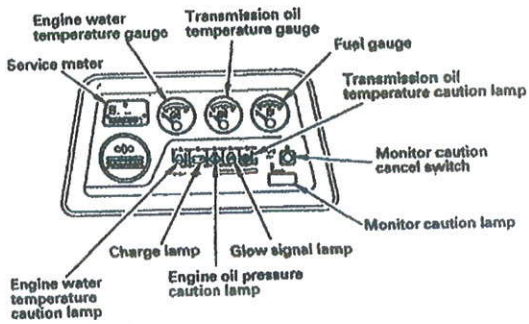
Controls of Komatsu track Dozer- exert from Komatsu D65 Manual for Baghel track Dozer #2

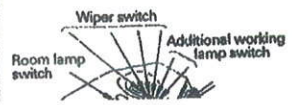
10.2 GENERAL VIEW OF CONTROLS AND GAUGES

Machines equipped with cab

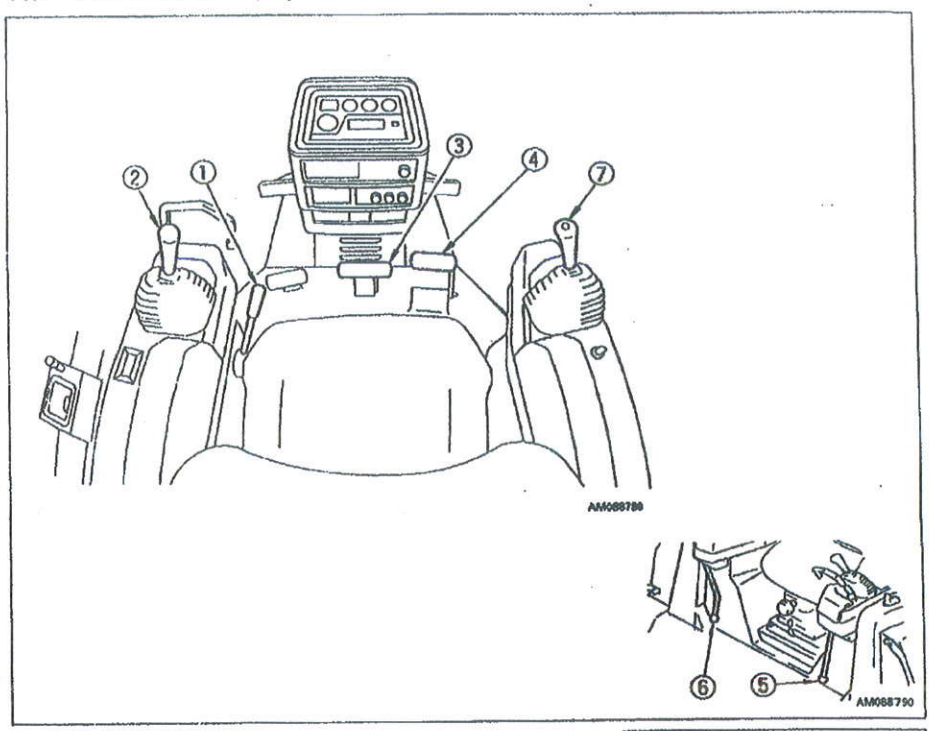




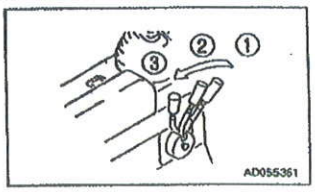




11.3 CONTROL LEVERS, PEDALS

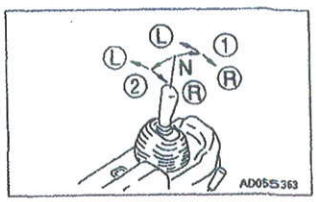


1. FUEL CONTROL LEVER
This lever is used to control the engine speed and output.
① Engine stop position: Push the lever forward fully.
② Low idling position: Pull the lever from engine stop position ① until you feel the operating force falls off.
③ High idling position: Pull the lever fully from low idling position



2. JOYSTICK (STEERING, DIRECTIONAL AND GEAR SHIFT LEVER)

This is used to select the direction of travel, to select the speed range of transmission, to carry out steering, and to carry out counterrotation turns.



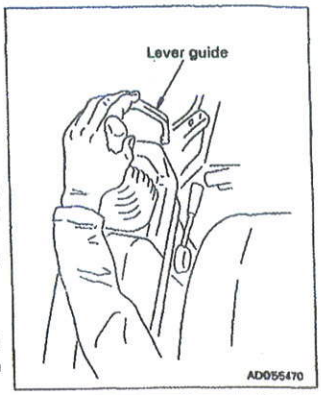
Forward-reverse shifting

①: FORWARD
②: REVERSE
N: NEUTRAL

Push the lever forward, the machine will move off forward.
Pull the lever backward, the machine will move off in reverse.

Steering

L: LEFT TURN
R: RIGHT TURN



Move the joystick to the FRONT to travel FORWARD
Move the joystick to the REAR to travel in REVERSE

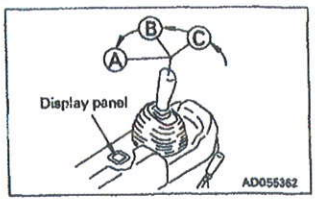
If the joystick is operated to travel forward or in reverse, and is then moved partially in the direction of turn, the machine will turn gradually.

If the joystick is moved further in the direction of turn, the machine will turn more sharply.

REMARK

If the lever is released when steering the machine, the lever will return to the ① position or the ② position and the machine will be returned to straight movement.

If you support the lever guide with your hand when steering, the turning operation will be easier.



Gear shifting

Rotate the joystick 30° to carry out gear shifting operation.

Position (A) : 1st
Position (B) : 2nd
Position (C) : 3rd

REMARK

When gear shifting operation is carried out, the display panel at the rear of the joystick will display the speed range.

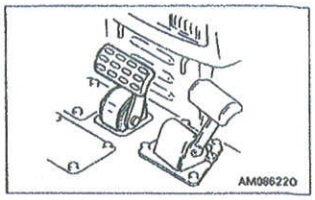
1st: 1 is displayed on the display panel
2nd: 2 is displayed on the display panel
3rd: 3 is displayed on the display panel

3. BRAKE PEDAL

⚠ WARNING

Do not place your foot on this pedal unnecessarily.

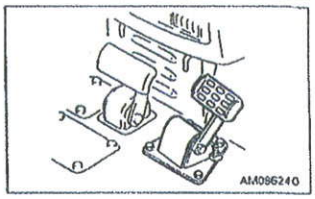
Depress the pedal to apply the right and left brakes.



4. DECELERATION PEDAL

⚠ WARNING

- **Do not place your foot on this pedal unnecessarily.**
- **When passing over the top of a hill or when a load is dumped over a cliff, the load is suddenly reduced, so there is danger that the travel speed will also increase suddenly. To prevent this, depress the decelerator pedal to reduce the travel speed.**



This pedal is used for reducing the engine speed or stopping the machine.

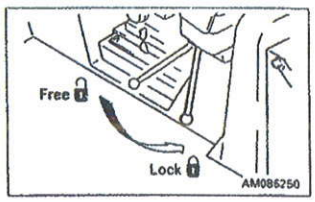
Depress this pedal to reduce the speed when shifting between forward and reverse or when stopping the machine.

5. PARKING LEVER

⚠ WARNING

When the machine is parked, always set the parking lever to the LOCK position.

This lever is used to apply the parking brake.



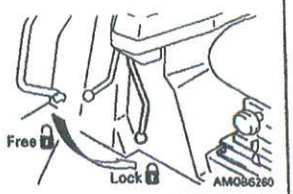
REMARK

- When the steering and directional lever is at the FORWARD or REVERSE position, if the parking brake lever is operated to the LOCK position, the steering and directional lever will automatically return to the N position.
- The engine will not start if the parking brake lever is not at the LOCK position.

6. SAFETY LEVER (FOR BLADE CONTROL LEVER)

⚠ WARNING

- **When standing up from the operator's seat, always set the safety lever securely to the LOCK position.**
  If the blade control and ripper control levers are not locked and are touched by accident, it may lead to serious injury or damage.
- **If the safety lever is not set securely to the LOCK position, the lock may not be applied.**
  Check that it is in the position shown in the diagram.
- **When parking the machine or when carrying out maintenance, always lower the blade to the ground, then set the safety lever to the LOCK position.**



This safety lever is a device to lock the blade control levers.
When it is set to the LOCK position, the TILT, LOWER, and FLOAT operations are locked.
If the blade control lever is at the FLOAT position and the safety lever is set to the LOCK position, the blade control lever is automatically returned to the HOLD position.

REMARK
If the blade control lever is at the FLOAT position, the engine will not start. To start the engine, first set the safety lever to the LOCK position.

I have been working as Senior Mechanic in BIPL under M/S Sasan Power Ltd Moher & Moher Amlohri Extension since 15th Dec2015.I come on duty daily in general shift .
Dated 19.05.2016 at about 9am I went at OB face where Mechanic (b)(6) other three helpers namely (b)(6) were present. With their help Inspection and checking had done on three excavators, 1 dozer and 1 grader on face.
After that I planned to do maintenance on road grader and dozer at OB dump and I told (b)(6) and other three helpers, to be at OB dump and I came at camp, taking the tools again went to OB dump.
Firstly the grader blade was changed and after that maintenance job at Dozer 2 had been started.About 1pm grader maintenance job completed ,at the same time I came at the camp,taking the empty container and (b)(6) Auto electrician,return back to OB dump.
Radiator guard and engine oil drainage work started by (b)(6) with the help ofother three helpers.I was sitting in the camper (Service truck MP ECC 0170)parked at the front.
Due to electrical fault there was the starting problem on the above mentioned dozerand horn was not functioning. (b)(6) was performing the job of horn by sitting at the driver seat,opening thecircuit wire at panel and checking it.
Maintenance crew and auto electrician had been working simultaneously.By that time at about 1.25pm suddenly the dozer started and the helper working on oil draining, (b)(6) sustained fatal injury and the camper parked at the front also jostled in which I was sitting.
(b)(6) informed that dozer crushed (b)(6) which leads to fatal death of him.I rushed to (b)(6) and gave the information of the accident to (b)(6)
And after that taking (b)(6) ,Shift In Charge I came to camp.
Ques-Who told you to get performed Auto electrical schedule maintenance job on Dozer-2?
Ans-(b)(6) Maintenance Incharge M/S BIPL

(b)(6)
Sr.Mechanic
M/S BIPL.

Statement of (b)(6) **Mechanic** (b)(6)
(b)(6)

I have been working as Mechanic in BIPL under M/s Sasan power Ltd since 15Dec 2015.I came on duty in first shift (6:00am to 2:00pm) on 19th May 2016.
About 9am I and (b)(6) Senior Mechanic and three helpers went on routine inspection on Excavators, dozers and grader parked at OB face.It is the tea break time, about 10:30 to 11:00 after the breakfast (b)(6) ,Senior Mechanic taking the tools from the camp(M/S BIPL) left for OB dump and told me and helpers to arrive at OB dump.About 12:00pm I along with three helpers reached at OB dump where (b)(6) ,Sr.Mechanic and (b)(6) Maintenance Incharge from M/S BIPL were already present .They have instructed first to perform the road grader maintenance job .
Road grader maintenance task had been completed at about 1:00pm.
It was told by (b)(6) Senior Mechanic that you with help of helpers place the radiator guard on dozer (no-2,mode D65 E-12)and after draining the oil I bring the auto electrician from the camp. I placed the radiator guard with the assistance of three helpers and after that I was performing oil draining job (b)(6) were working with me as helpers.
Engine oil had been draining out by loosening the engine plug by (b)(6) ,sitting between the crawlers and below the engine .Drained out oil was being filled in the container kept nearby , by me with the help of other two helpers.
During this (b)(6) ,Auto electrician arrived there and started to check horn.He took out the old horn and taking the new horn sat in the driver seat ,checking by opening the panel and taking out the wire.I was sitting on the crawler at that time (b)(6) had been instructed by (b)(6) (b)(6) to check the starting problem in the machine.
When the checking was being done by (b)(6) sitting at the driver seat ,opening the wires in the panel box(circuit wire),I was sitting on the crawler at that time (b)(6) was sitiing below the engine and other two helpers (b)(6) were standing at the side. Sitting on the crawler, I had changed engine oil filter and was cleaning with the clothes. At that time suddenly the dozer got started and moving ahead. I immediately jumped from the crawler, which lead to injury at my right leg.
I saw that the dozer ran over and crossing (b)(6) moved ahead and started to push the camper(Mahindra Service Vehicle) parked at the front,in which (b)(6) was sitting.I stopped the dozer by immediately climbing on the moving dozer.Service vehicle also got tilted (b)(6) was screaming sitting at the driver seat .After the dozer got stopped (b)(6) was repeatedly telling to save him.After that we all went to see (b)(6) Seeing the critical situation ,accident information had been given by (b)(6) ,Senior Mechanic to (b)(6) Then I and (b)(6) went to camp with the service vehicle(MP66c0170) of which the door was damaged due to colliding with the dozer .Nearby the camp gate, (b)(6) Maintenance Incharge and (b)(6) Volvo Incharge both went to accident site by Service vehicle.I came back to camp.

(b)(6)
Mechanic- M/S BIPL.

TRANSLATION

Statement of (b)(6) **Helper** (b)(6) (b)(6)

In M/s.Sasan Power Limited's Moher and Moher Amlorhi Extension O. C.P. I am working as Mechanic Helper; I am employed in M/s. B. I. P. L in January 2016.

On date 19.05.2016 I was on duty in first shift (time 6:00 A.M to 2:00 P.M). (b)(6) (b)(6) are with me as helper; first we had carried out the maintenance of Excavator-03, 1 dozer and 1 grader in presence of (b)(6) (Service Mechanic) and (b)(6) (Mechanic)

About 12:00 noon all three Helper went to OB Dump face for maintenance of Grader and Dozer – 02 which was already in standing in dump. First of all the maintenance of Grader was completed around 1 PM after that Schedule maintenance of Dozer-02 work started, as oil changing work is in progress at same time the horn & starting problem work was being carried out by (b)(6)

First/in starting drain plug & guard cover opening work is given to (b)(6) for which he has to go below Engine, when he was tired then (b)(6) went below engine and oil draining work started.

At same time (b)(6) (Auto Electrician) was sitting on driver's seat and checking the circuit,all of a suddenly at 1:25 PM Dozer -02 starts and moving forward and the person (b)(6) (b)(6) working below engine hurt very badly and died on spot and dozer-02 also hits the service vehicle and damaged it. After that (b)(6) jumped out of Dozer and come near to service vehicle and repeatedly speaking to save him.

After that (b)(6) informed about the accident and they both moved in camp in their service vehicle and me and (b)(6) moved to OB face and (b)(6) (b)(6) ran away from that place.

THE ABOVE STATEMENT WAS GIVEN BY ME

Witness:- (b)(6)

The statement given by (b)(6) was read by me for (b)(6) (b)(6) (Helper) in presence of DGMS on 20.05.2016,and the above statement accepted and duly signed by him.

Statement of (b)(6) (b)(6)

I have been working at Moher & Moher Amlohri extension of M/S Sasan Power Limited since May 2015. I was working as Assistant Manager/Shift incharge on 19/5/2016 in A-shift (b)(6) ,Assitt Manager was overall incharge of outsourcing work M/S BIPL-KNIL-was deployed as outsourcing agency for removal of OB above Purewa seam.Average coal production was 50,000 + production and OB removal about 135,000m^3 per day (including contractual work).In every shift 4 Asst Manager and 8 overman were deployed to look after the safety and production.

To achieve this above mentioned target of coal and OB,4 shovel,1 Dragline and 2 FEL 35 dumpers of departmental equipment ,6 Excavator and 30 tipper of contractual agency was being deployed.

On 19/05/2016 in Ashift (b)(6) Assistant Manager myself and (b)(6) (b)(6) all overmen were present in the shift to look after the safety and production .

(b)(6) was deployed in outsourcing work.Here I want to add that M/S BIPL KNIL-JV had also deployed two overman and five unqualified supervisor to look after the safety and production every shift.

On 19/5/2016 at about 10am I inspected the out sourcing work and met with (b)(6) and him necessary interaction.I also inspected the OB dump yard(contractual) and found everything OK.

At about 10:30 pm I was in time office I received a call from (b)(6) overman who informed me regularly this occurrence of the accident .I immediately informed the scene to (b)(6) Manager and rushed to the accident site. I found that (b)(6) was seriously injured,So I tried to call ambulance but unable to contact ov driver.I saw that (b)(6) ,Asstt Manager/outsourcing (b)(6) (b)(6) acting Safety officer were present at the accident site.Again I went to arrange ambulance .After arranging ambulance I made a call to (b)(6) safety officer.He replied me that ambulance was not required.Again I rushed to accident site.I was shocked so I left the place.

Ques: What was the cause of accident?

(b)(6) was working under the mechanic and (b)(6) auto electrician was working simultaneously on the dozer to repair the horn.Suddenly dozer got started ,moved and caused serious injurious to which he succumbed instantaneously.

Ques: How this accident could how have been ?

Simultaneously mechanical and electrical work should not be carried out on same machine at same time

.

Ques: All person should follow the code of framed by the Mine Manager/Colliery Engineer

(Mechanical)

I have read out above mentioned statement .I have no objection.

(b)(6) [redacted]

Asst.Manage/Shift In charge

21/05/2016

Statement of (b)(6) (b)(6)

I have been working at Moher & Moher Amlohri extension of M/S Sasan Power Limited since May 2015. I was working as Assistant Manager/Shift incharge on 19/5/2016 in A-shift (b)(6) ,Assitt Manager was overall incharge of outsourcing work M/S BIPL-KNIL-was deployed as outsourcing agency for removal of OB above Purewa seam.Average coal production was 50,000 + production and OB removal about 135,000m^3 per day (including contractual work).In every shift 4 Asst Manager and 8 overman were deployed to look after the safety and production.

To achieve this above mentioned target of coal and OB,4 shovel,1 Dragline and 2 FEL 35 dumpers of departmental equipment ,6 Excavator and 30 tipper of contractual agency was being deployed.

On 19/05/2016 in Ashift (b)(6) Assistant Manager myself and (b)(6) (b)(6) all overmen were present in the shift to look after the safety and production .

(b)(6) was deployed in outsourcing work.Here I want to add that M/S BIPL KNIL-JV had also deployed two overman and five unqualified supervisor to look after the safety and production every shift.

On 19/5/2016 at about 10am I inspected the out sourcing work and met with (b)(6) and him necessary interaction.I also inspected the OB dump yard(contractual) and found everything OK.

At about 10:30 pm I was in time office I received a call from (b)(6) overman who informed me regularly this occurrence of the accident .I immediately informed the scene to (b)(6) Manager and rushed to the accident site. I found that (b)(6) was seriously injured,So I tried to call ambulance but unable to contact ov driver.I saw that (b)(6) Asstt Manager/outsourcing (b)(6) (b)(6) acting Safety officer were present at the accident site.Again I went to arrange ambulance .After arranging ambulance I made a call to (b)(6) safety officer.He replied me that ambulance was not required.Again I rushed to accident site.I was shocked so I left the place.

Ques: What was the cause of accident?

(b)(6) was working under the mechanic and (b)(6) ,auto electrician was working simultaneously on the dozer to repair the horn.Suddenly dozer got started ,moved and caused serious injurious to which he succumbed instantaneously.

Ques: How this accident could how have been ?

Simultaneously mechanical and electrical work should not be carried out on same machine at same time

.

Ques: All person should follow the code of framed by the Mine Manager/Colliery Engineer

(Mechanical)

I have read out above mentioned statement .I have no objection.

(b)(6) [redacted]

Asst.Manage/Shift In charge

21/05/2016

TRANSLATION

Statement of (b)(6) (b)(6)

In M/s.Sasan Power Limited's Moher and Moher Amlorhi, Extension O.C.P. I am working as Mechanic Helper; I am employed in M/s. B. I. P. L in January 2016.

On date 19.05.2016 myself (b)(6) after completing maintenance work at OB face, about 12:00 noon we all three (Helper's) went to OB Dump for maintenance work.

As per instruction of (b)(6) Mechanic and (b)(6) Service Mechanic, we had changed the Blade of grader.

Around 1:00 PM maintenance of Dozer-02 work started. (b)(6) gave instruction to open the drain plug. I went below Engine removed guard cover and loosen the drain plug. I was tired as to open engine guard cover I have to bow down and I called (b)(6) to come down below Engine but instead of him (b)(6) Helper came down. The oil drained by him received by me and collecting in container.

(b)(6) Mechanic sitting on crawl and changing the oil filter. At same time (b)(6) (b)(6) (Auto Electrician) opened the panel box and checking the circuit wire. (b)(6) (b)(6) gave instruction to me and (b)(6) to go to OB face. I was standing there for a while, suddenly Dozer -02 starts and moving forward and (b)(6) working below engine was dead.

(b)(6) repeatedly speaking to save him. (b)(6) giving information to somebody about accident, after that (b)(6) they both sat in their service vehicle moved in camp, me and (b)(6) moved to OB face

THE ABOVE STATEMENT WAS GIVEN BY ME

Witness:- (b)(6)

The statement given by (b)(6) **Helper** was read by me for (b)(6) in presence of DDMS on 20.05.2016,and the above statement accepted and duly signed by him.

Statement of (b)(6)
(b)(6)

I have been working in M/s BIPL ,under M/s Sasan power Ltd Moher & Moher Amlohri extension.
I had come for work on 19th May 2016 in 1st shift. (b)(6) Shift incharge of M/S BIPL had allocated me at Dozer -2.
At the beginning of the shift I have inspected my dozer .I found everything ok.At about 11am there had been the problem in the Horn, back light and starting the dozer. Senior Mechanic, (b)(6)
(b)(6) arrived at OB dump yard(contractual).I put all the problems before him. As advised by him I parked the dozer-2 at the empty level.After that (b)(6) Shift Incharge instructed me to go at the contractual OB face (b)(6) and three helpers were performing the maintenance task on my dozer.At the same time I went at the OB face (contractual).I was standing at the OB face there. About 1.30pm it was notified by Volvo operator that mishap took place by the dozer which you were operating and a helper got fatal injury .
Hearing that I was worried and then I went down and afterward s went home.

Above statement has been read and found correct .

(b)(6)
Diesel Operator

Statement of (b)(6) (b)(6)

I was employed in M/s BIPL (Contractor) working for M/S Sasan Power Ltd. In Moher & Moher Amlohri Extension OCP in Jan 2016
I have been working in M/S L&T Dealer, Singrauli for last 7years, my qualification is ITI diesel mechanic and also completed my Diploma in Mechanical Engineering through correspondence .
My maintenance team having 2 mechanics and 4 helpers and (b)(6) is the Head Mechanic.
On 19/5/2016 Dozer-02 is due for schedule maintenance, and other defects such as light, starting problem and horn failure.

Questions

1. How long are you working as supervisor?
   Last 7years
2. Why did you assign the job to (b)(6) ?
   I did not assign the job to (b)(6) had assigned.
3. Did (b)(6) train to do such type of job as Auto Electrician?
   No, he was not trained.
4. Did you tell (b)(6) to do work?
   No I did not tell (b)(6) to do work.
5. Did (b)(6) train to do such type of job?
   No,he was not trained.

Statement of (b)(6)
(b)(6)

I have been working in M/S BIPL under Moher &Moher extension Amlohri since Dec 2015.Maintenance related task of HEMM, placed by BIPL is being done by me .for the maintenance of tipper and excavator AMC has been done with VOLVO.Technician is being placed in the general shift by them,and if required they are called in the night shift too. There are two technician of Volvo and helps are provided to them by BIPL .To look after other HEMM 4 technician and 16 helpers are being provided ,who perform schedule and running bd maintenance in general shift and shifts (A,B,C).
Dated 19.05.2016 ,three dozers were parked in the first shift,among which two dozers were working at OB dump yard.Dozer-02 was stopped for schedule maintenance at about 12:00pm.(b)(6) Sr. Mechanic and(b)(6) Mechanic and three helpers were called to perform schedule maintenance.
At about 12:00 (b)(6) and three helpers were made engaged to change engine oil and engine filter .Since there was horn and starting problem in Dozer -02 ,So I accompanied (b)(6) (b)(6) Sr Mechanic and came to camp.Then I sent (b)(6) along withtools (New horn and electrical wire)and (b)(6) ,Auto electrician to Dozer-02 sothat auto electrical related problem should be resolved .I stayed at the camp.I sent both the crew so that the schedule and bd maintenance could be completed between 12:00 to 2:00pm .
But about 1:30pm got informed by(b)(6) about the accident .I immediately informed (b)(6) (b)(6) Supervisor and advised to come with the vehicle at the earliest.I along with (b)(6) (b)(6) left for the accident site.We met (b)(6) Sr. Mechanic and (b)(6) the way.we got the information regarding the accident by them.
I immediately got parked the service vehicle at the side.I saw that the door of the service vehicle got damaged..Then I was again going to the accident spot,seeing the crowd I did not go instead came back to camp.The information regarding accident has been given by(b)(6) to others.
Ques-When did you go to accident site?
Along with Manager ,Project Manager (M/S BIPL) and (b)(6) director (M/S BIPL) went to accident site.
Ques-what did you see on accident site?
(b)(6) was deceased and dozer was about 9-10 m away from the parking area.
Ques-Should both the maintenance crew allowed to work simultaneously?
No
Ques:What was the reason for the accident ?
Starting and moving forward of the dozer-02 by(b)(6) is the main reason of the accident .
Ques: How accident could have avoided??

1. Both the crew would not had been allowed working simultaneously.
2. (b)(6) should not have startedthe dozer.

(b)(6)

Statement of (b)(6)
(b)(6)

I am employed an M/S BIPL (contractor) working for M/S Sasan Power LTD in Moher and Moher Amolhsi Extension, OCP in Jan- 16 as a helper

Before I worked in M/S Essaz Power Plant as a rigger and I was at home for the last six months as thje company was closed. I am studied up to class 10th.
In M/S BIPL I was engaged to deliver breakfast to all opertators in the field during breakfast time and after that work I have been asked to work with Mechanic as helper.
In March 2016 I have been engaged as helper to Auto Electrician (b)(6)
On 19.5.16 as (b)(6) was on leave and he is the alone Auto electrician in M/S BIPL.
On 19.5.16 on coming on duty between 9am to 1030 am I delivered the breakfast to operators on OB face (b)(6) Supervisor told me to go to coal face to deliver the breakfast and water bottle of (b)(6) I reached at coalface by 11:30 am and given the breakfast to Operators
After returning from Coal face (b)(6) took me in Xylo in outsourcing OB Dump near Dozer 02, near about 12:00 noon
Dozer 02 was already standing in Dump I have seen that (b)(6)
(b)(6) Dozer02 after draining oil
(b)(6) was sitting between blade and track chain for shade.
(b)(6) was angry for water bottle and he scalded me in front of (b)(6)
and (b)(6) asked (b)(6) to take (b)(6) after lunch for horn replacement, but (b)(6) didn't listen and took me with him at dump, by saying that when you came to work you had to come in sunny weather also and forcefully took me to dump.
(b)(6) told me to open radiator guard and told me to remove old horn. After taking out old and connected wires to it and asked (b)(6) which is phase and which is earth wire
Befor I had never worked on electrical jobs. At the time (b)(6) was sitting in the Xylo car and screamed/shouted check it on your own.
After that I climber Dozer-)2 from RHS and seen that the Ignition switches hanging down from dash board and no key in it
For testing of horn I contacted horn wire in ignition switch connection points. Suddenly the dozer get started, I was frightened and tried to stop Dozer by lifting the RHS lever, but Dozer not stopped. In fear I lifted LHS lever, still dozer not stopped and starts moving forward. I started shouting loudly for help. I grabbed RHS jockey but still didn't stop
(b)(6) was standing near Dozer run and climbed on Dozer and stop the Dozer
After that when I looked behind, saw that (b)(6) was fallen on the ground and due to fear I urinate in the pants. By the time the Dozer hits the Xylo (maintenance vehicle).
After that I went to (b)(6) and told/speak to him to save me, but he himself started the maintenance vehicle an ran away from site/OB dump and told me to run away from this place.
I was frighten and I gone down the dump by doing that I fell down and I lost my mobile phone, my clothes were torn. Anyhow I reached the on road and in bus I went to Bargawa

OCCUPATIONAL HEALTH AND SAFETY

Workshop on Toolbox Talk

Sasan Ultra Mega Power Project
6 X 660 MW

TBT Workshop at SUMPP

- A workshop was conducted on How to conduct “Tool Box Talk and its advantages in construction Activities”
- Participants included Project Managers, Engineers, Supervisors and Safety Professionals of Reliance and associates.
- Advantages of Good and effective TBT were discussed.
- Role clarity on who should conduct TBT and its Duration was informed to Participants.
- What should be the location and theme of Tool box Talks .

Tool Box talks-Delivery Methodology

- Supervisor/Engineer to deliver the Talk.
- Should be scheduled at the beginning of the work shift.
- Meeting should be done at the job site.
- Duration should be approximately 10-15 minutes.
- Discussion and review of the previous meetings to be done as reminder.
- Discussion on the current task to be done.
- Discussion on the safety issues including environment, hazards, use of personnel protective equipment, first aid and medical support and emergency procedures.
- Worker participation is to be encouraged.
- There may be review and recapitulation with quiz or test.

Advantages –As discussed

- Promotes safety awareness. Workers get actively involved in safety matters and reduce safety risks.
- Introduces workers to new safety rules, equipment, preventive practices and motivates workers to follow standard operating procedures.
- Provides vital information to the workers on accident causes types and preventive actions.
- Emphasizes planning, preparation, supervision, and documentation.
- Helps when reviewing new laws or industry standards, company policies and procedures.
- Encourages workers to discuss their experiences that help to review safety procedures in future.

Workshop for Supervisor/Engineers - M/s Powermech

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Workshop for Supervisor/Engineers - M/s JMC in Unit # 6.

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Workshop for Supervisor/Engineers -M/s ITDC in Unit # 6.

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Workshop for Safety Engineers – Classroom Programme

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Workshop for Supervisor/Engineers - M/s L&T Elect

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Workshop for Supervisor/Engineers - M/s L&T-C&I

RELIANCE

Workshop for Supervisor/Engineers - M/s Shivam

RELIANCE

Workshop for Supervisor/Engineers - M/s Arudra

RELIANCE

Workshop for Supervisor/Engineers - M/s Hamon Shriram

RELIANCE

Workshop for Supervisor/Engineers - M/s Sinofinn

RELIANCE

Thank You