HINDUSTAN ZINC
Zinc & Silver of India

HZL Standard

"Load Haul Dump (LHD) Operations"

	Reviewed by	Approved by
Name	Vinod Jangir	Arun Misra
Sign.		
Date	27.03.2023	

DOCUMENT CONTROL DETAILS

Revision	Date	Reason for Issue	Compiled by	Approved by
0	01/08/2020	First edition	Sachin M Deshmukh	
1	27/03/2023	Secord edition	Sachin M Deshmukh	
Next Review Date	01/01/2024			

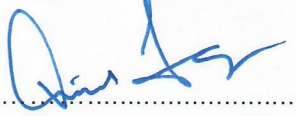
User Notes: - The Corporate Safety Council (CSC) is the custodian of this document and is responsible for the Administration and Authorization of this Standard. CSC is responsible for confirming the accuracy and integrity of content and proposed changes to the Standard.

Controlled copy of the current version of this document is held at CSC and available on its portal. Any printed / electronic copy of this document is uncontrolled. It is recommended that users verify that the version being used by them is the current version by referring to the controlled version.

DOCUMENT ISSUE

The "Load Haul Dump Operations" Standard is issued by the Corporate Safety Council on behalf of Hindustan Zinc Limited management and forms a part of the HZL Integrated Management System.

Name: VINOD JANGIR

Signed: 

Date: 27.03.2023

Acknowledgement

The management acknowledges the contributions of the following individuals for being a part of the Zone / location workgroup and for their assistance in preparing this standard on Load haul and Dump (LHD) operation.

Zone / Location	Members
Rampura Agucha UG Mine	Mr. Sachin M. Deshmukh Mr. Toms Joseph Mr. Vedant Tiwari Mr. Narahari Murikunthala
Kayad Mine	Mr. Sanjay Dhanani
Zawar Group of Mines	Mr. Satish Thakare Mr. Anumula Mallesh
Sindesar Khurd Mine	Mr. Chetan Sankhla
Rajpura Dariba Mine	Mr. Sawariyan Vaishnav
Corporate HSE	Mr. Vijay Kumar Goyal
Mentor	Mr. Praveen Sharma

Abbreviations

- CSRP – Corporate Standards, Rules and Procedure Subcommittee
- HZL – Hindustan Zinc Limited
- HSE – Health, Safety and Environment
- IMS – Integrated Management System
- LOTO – Lockout Tagout
- CSC – Corporate Safety Council
- UIC – Unit Implementation Committee
- ZSC – Zone Safety Committee
- SRPSC – Standards, Rules & Procedure Subcommittee
- PPE - Personal Protective Equipment
- EOHS – Environment Occupational Health & Safety
- FAI - First Aid Injury
- MTI - Medical Treatment Injury
- RWI - Restricted Workday Injury
- LTI - Lost Time Injury
- DINS - Distribution Incidents
- SPI - Serious Process Incident
- OTJ - Off the Job
- S&FS – Safety & Fire Services
- HIRA – Hazard Identification and Risk Assessment
- SOP – Standard Operating Procedure
- WI – Work Instruction
- PTW – Permit to Work (also known as Work Permit)
- LHD- Load Haul Dump
- LOS- Line of site (Bogging).
- OEM- original equipment manufacturer
- SSL-safe stop line.
- HTH – Hydraulic Toe Hook
- MTH – Mechanical Toe Hook

Table of Contents

S. No.	Particulars	Page No.
1	Abbreviations	5
2	Introduction, Intend and purpose, Scope	7
3	References	7 - 8
4	Duties and responsibility	8 - 9
5	Definitions	10 - 13
6	SHE consideration	
6.1	Safety PPE requirements	13
6.2	Cap Lamp Signals	14
6.3	Potential hazards	14
6.4	General Safety Measures	14
7	Procedure	
7.1	Authorization process	15
7.2	Start of shift procedure	15
7.3	Deployment of LHD in various activities	15 - 16
7.4	Standard Guidelines	16 - 21
8	Annexures	
	Annexure 1. Authorization process form and authorization certificate	22
	Annexure 2. Pre-check form (to be filled by operator in consultation with OEM)	23
	Annexure 3. Pre-check (to be filled by Maintenance engineer)	24
	Annexure 3a. Pre-check (to be filled by Maintenance engineer)	25
	Annexure 4. Flow chart of LHD operation	26
	Annexure 5: RACI Chart	27

1. Introduction

This standard is to prevent injury to men during operation of LHD in different activities in mines and to prevent damage to the machine during operation in stopping areas. The LHD machines are deployed in mines for various operation, which are high risk activities involving safety of men and machinery. LHD operation is also part of the traffic hazards in mine during tramming and bogging operation. LHD of different capacities are under operation in mines depending on the scale of mining, size of mine and method of Mining. Several HIPO and near miss and incidents were witnessed with LHD operation.
Therefore, the need arises to develop a standard for LHD operation which can be deployed horizontally across all mines of HZL and will be useful for Mines to prepare the Safe Operating Procedures based on the site's safety and operational needs. This standard describes the requirement for operation of LHD based on the incidents in mines and offside incidents.

1.1 Intent and Purpose

This standard has been developed by cross functional teams from all Zones of HZL. The requirements which have been identified here are equally applicable across all Zones/ sites of HZL. This will also help in bringing about consistency in the process used across all locations.

The Standard will help to provide a new impetus towards achieving the best-in-class safety standards. This standard is formulated based on best practices.

2. Scope

This standard applies to all Mines of Hindustan Zinc Limited (HZL) business units and incorporates the requirements of the Vedanta Standard. It is applicable to all HZL operations, including admin/corporate offices and research facilities located off site; during exploration, through all development phases and construction, operation to closure and, where applicable, for post closure management. National regulations shall be used in conjunction with this standard.

3. References

3.1. Corporate Policy

3.1.1. HZL HSE Principles and Policy

3.2. Corporate Standards

3.2.1. GN 07: Risk Assessment
3.2.2. Vehicle and driving safety standard
3.2.3. Permit to Work Standard
3.2.4. Vehicle and Driving Safety standards.
3.2.5. Lifting and shifting standard.
3.2.6. Traffic Management SOP.
3.2.7. Sop for Re-entry
3.2.8. Sop for watering down.

3.2.9. SOP on Development face Bogging. 3.2.10.
SOP for development face clean up.
3.2.11. SOP for LOS bogging.
3.2.12. SOP for tele-remote bogging.
3.2.13. SOP for raise bore bogging.
3.2.14. SOP on assessing of Development and Production levels
3.2.15. SOP for towing of machine.
3.2.16. SOP for shifting of raise bore reamer.
3.2.17. Towing/retrieval of LHD from stopes.
3.2.18. SOP for shaft bottom cleaning
3.2.19. SOP for towing of mobile plants
3.2.20. Shifting of cable drums, ventilation fans, electrical substations, transformer, refuge chambers etc.
3.2.21. Standards maintenance procedures
3.2.22. Past Incidences learnings.

3.3. Other references

Metal Mines Regulations 2019 (draft)

4. Duties and Responsibilities

Line management has the responsibility to implement this standard.

Note: Overall Responsibility lies with the Mine Manager

4.1 LHD operator

1. Shall not operate the machine without authorization.
2. Not allow any un-authorized person to ride on the machine.
3. Inspect the machine assigned to him in the beginning of his shift and test the various systems, sub-systems and protective devices, as stipulated in this respect by the engineer in consultation with the manufacturer or supplier (OEM).
4. Shall not take out the machine for work nor shall he operate the machine unless he is satisfied that it is mechanically sound and in efficient working order.
5. Perform the walk around inspection of the working areas like development face, stopes etc. before start of work.
6. Shall not move or operate the machine when persons are in such proximity as to be endangered.

7. Shall not leave the machine in on condition and ensure completely power cut off.
8. During loading, the machine operator shall not overload or project any material, on the truck, tipper or dumper beyond the side of its body.
9. Shall not allow mechanical fitter to open any part while machine is in operation or running condition.
10. Shall enter the condition of the machine at the end of his shift in the register or book maintained for necessary information of his successor.
11. Report the Unsafe acts and Unsafe condition, near miss incidences during the shift.

4.2 Assistant Mine Manager/ Section In-charge:

- Ensure all applicable standard training to the persons involved in LHD operation.
- Training and awareness on SOP for LHD operations.

4.3 Shift In-charge/Under Manager

- Ensure the safe Work execution and follow the SOP of LHD operation.
- Inspect the stopping area and the LHD operation areas.
- Mark the NO GO line and force stop line in stope.
- Conduct toolbox talk and give safety instructions for work.
- Ensure Safety of Man and machine.
- Inform to Mines manager and Safety Officer in case of Emergency.

4.4 Shift Foreman

- Will ensure the safe Work execution.
- Conduct toolbox talk and give safety instructions for work.
- Inform to Shift In-charge in case of Emergency.

4.5 Emergency Response Team (ERP)

- Safe rescue of any personnel affected during work as per the information received from mine.
- Barricading & controlling movement of persons and vehicle from the rescue area.

5. Definitions

5.1 Mines Manager - A person who is legally notified and authorized by Occupier to discharge his duties.

5.2 Authorized LHD operator— a person who has attend the age of twenty-three years and who has been duly appointed in writing by the Mine Manager as a Person competent to operate the machinery and who is responsible for the duties assigned to him.

Such person has good knowledge of the machine and knows the potential sources of hazards during operation. The person shall be authorized after training and field assessment by the OEM and Assistant Manager.

5.3 Authorization Process — a verification process, which documents that a person has the necessary training, skill, competency, experience and the ability to perform designated roles and tasks.

5.4 Visitor – any third party person who has not been inducted under HZL safety policy. Such person may be a subject expert/consultant/ OEM/Supplier from another organization.

5.5 Risk Assessment – The formal process of identifying, assessing and evaluating the safety, health and environmental risks that may be associated with a hazard. For example: Hazard Identification Risk Analysis (HIRA), Job Safety Analysis (JSA), etc.

5.6 Stope – Underground excavation made by removing surrounding rock by drilling and blasting.

5.7 Stope Brow - the out bye edge of draw cross cut at the extraction level beyond. Ref. Fig 1

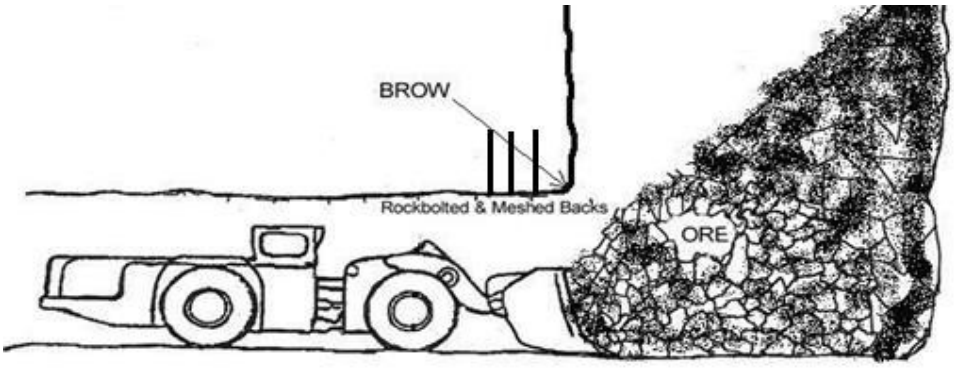


Fig.1. Stope brow

Brow Support - Permanent support installed as per SSR before start of the stope blast. Brow support may require rehab if any damage is observed after blast or during bogging operation. (Ref. Fig 1a)

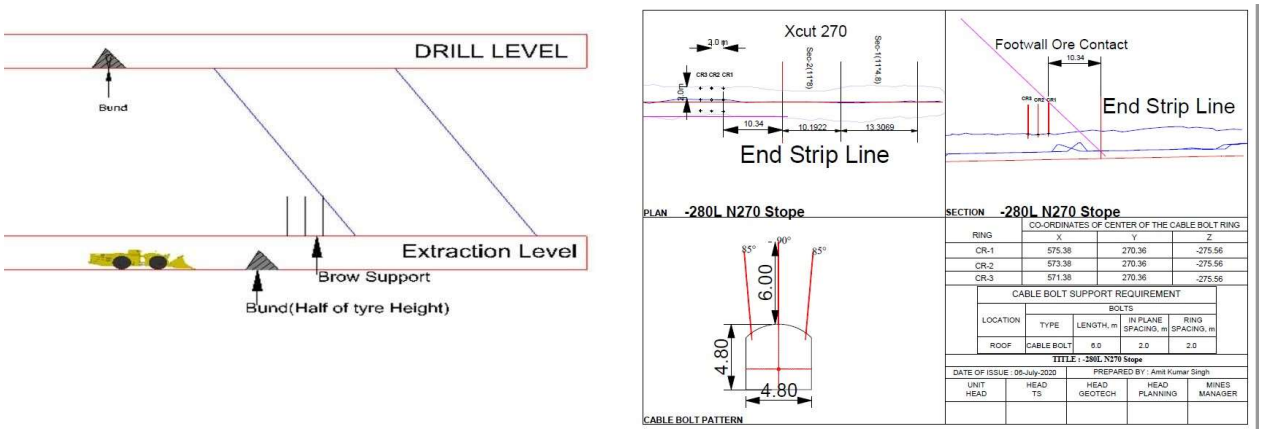


Fig. 1 a Brow Support

5.8 Bogging - process of removal of muck from the development blasted face or from the stopping area by LHD.

5.9 Free Bogging - process of removal of blasted ore by LHD where the brow of the stope is not opened, and muck reeled down from the stope as per the angle of repose and LHD operator's cabin always remains in the supported ground. (ref. Fig 2). In this operation the LHD operators remains inside the machine.

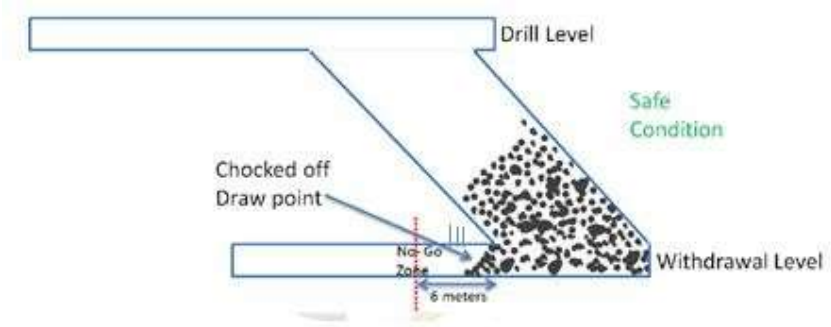


Fig.2 Position of Draw point with brow closed (safe for free bogging)

5.10 Remote Bogging - the position of muck where the brow of the draw cross cut gets opened and muck cannot reel outside the brow till supported ground, also the cabin of the LHD is beyond the unsupported ground of the stope brow. This again depends on the support damage due to th e blast. Ref. Fig. 3. In this operation the operator is not inside the machine for operation and LHD is operated by remote, through line of sight (LOS) remote or tele remote.

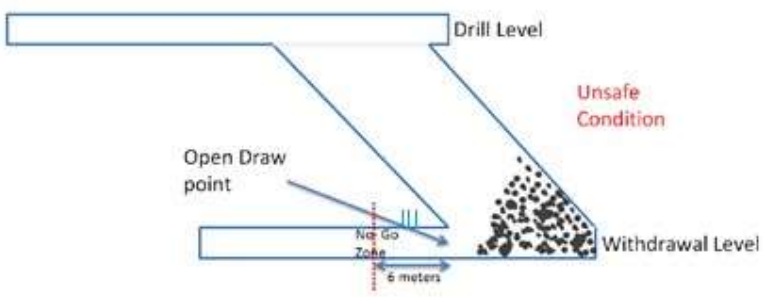


Fig.3 Open brow of the stope (require remote bogging)

5.11 NO GO Line - a safe distance from the open edge of the stope beyond which the entry of the personnel is prohibited. The NO GO line shall be marked by the competent supervisor (ref. Fig 4). Points for consideration for NO GO line. Normally this distance varies from 6 to 9m for drive of ±5m.

1. Condition of ground support after stope blast.
2. The distance of the projectile of the reeled muck from the stope.
3. The location of NO GO line shall be selected as: Height of the drive or cross cut +0.5m.

5.12 Safe stop line - a remote loader operator is not permitted to move a loader on remotes behind this line (towards operator), the safe stop line should be at least 10m on the stope side of the remote cuddy (ref. Fig. 4)

5.13 Remote cuddy/Man Cuddy - a safe place for the LHD operator from where the loader can be operated through remote control of the machine (ref. Fig 4). Following points shall be considered for selection of remote cuddy.

1. Length of the draw cross cut.
2. Maximum length of the machine (LHD).
3. Ground conditions.
4. Breaking distance of the LHD.
5. Communication range of the remote with machine.
6. Maximum length of the stope.

In case of moving brow, the placement of remote cuddy shall be decided by considering the above points.

5.14 Safe operating distance -

The minimum distance between the operator and the machine beyond which the hazard associated with the functioning are acceptable (ref. Fig. 4)

The remote operator work location should be designed in such a manner that it ensures the remote equipment cannot come in contact with operator under any circumstances. This distance shall be determined by risk assessment. Following points shall be considered

1. Machine operation area.
2. Safe operating distance.
3. Determining the breaking distance to bring the machine at complete stop.
4. Machine articulation area.
5. Full and clear visibility of machine operational area to the operator.
6. Proximity of safety zone i.e. remotes cuddies, physical barrier, safety barrier.
7. Operator's reaction time.
8. Remote control/machine electromechanical reaction time.
9. Environmental conditions.
10. Remote to machine communication range.

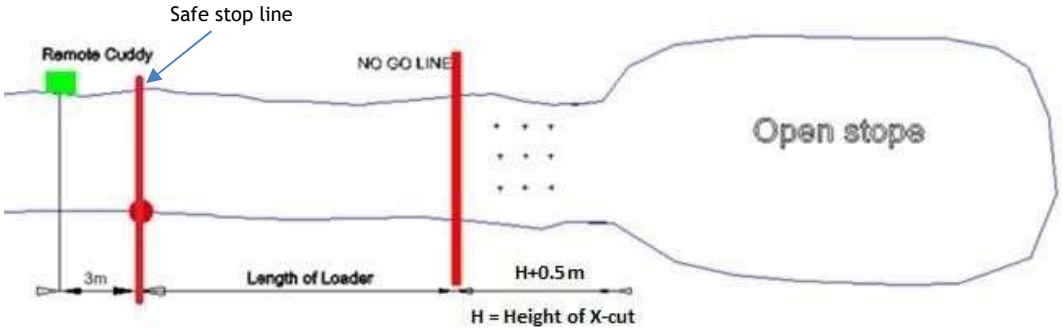


Fig. 4. Safe operating distance for remote operation of loader

6. SHE Consideration

6.1 Safety PPE Requirement

- Personal protective equipment (PPEs)


Gas Detector


Helmet


Gumboot


Goggles


Ear Plug


Camp lamp


Dust mask


Reflective Jacket


Self Rescuer


Hand Gloves


Flasher Light

6.2 Cap Lamp Signals

Circular Motion - Come toward me.
Up and Down - Move away from me.
Side to Side - Stop.

6.3 Potential Hazards

- Remote control failure (Crushing).
- Machine failure (crushing).
- Operator error (Crushing).
- Exhaust fumes and heat from the machine (fatigue).
- Rock projectile from them machine.
- Poor visibility at the brow due to dust formation • Man-machine & Machine to machine interaction

- Fall of ground.
- Sudden rolling of muck from the stope.
- Damage of brow or brow support.
- LHD stuck inside the stope.
- Toppling of LHD inside the stope or during loading.
- Breaking down of the LHD inside the stope.
- Failure of communication system.
- Rolling down of LHD due to defunction of HTH (Hydraulic Toe Hook).
- Damage of wind screen due to foreign material during bogging
- Finger injuries
- Malfunctioning of the remote.
- HEMM Fire

6.4 General Safety Measures

- Brow of the stope shall be supported as per Systematic Support Rules of the mine.
- Remote cuddy location selection shall be done at the planning stage of the stope and execution shall be done during the development of the draw cross cut.
- Remote cuddy shall be supported after excavation.
- Hangers shall be laced inside the man cuddy to place the remote of the loader unloading the bucket in the truck.
- Remote mucking signages shall be installed before start of the loading operation.
- Flasher lights shall be installed at the stope entrance and at the loading points.
- Loading pockets as per the design shall be excavated based on the size of LHD buckets and shall be free from the services like cables, pipes etc, to avoid damage.
- Blind spot training shall be given to the loader operator and to all the people going in underground.

7. Procedures

7.1 Authorization Process

- The operator shall be trained in Vedanta's Vehicle and driving standards.
- The operators shall be trained in LHD operation by OEM and operation expert.
- The classroom training shall be done for the machine operation by OEM followed by feedback test.
- Practical test shall be carried out by OEM and operation expert.
- After successful completion of training, assessment operator shall be authorized in writing by the Mine Manager only. (Ref. Annexure 1.)

7.2 Start of Shift Procedures

The operator shall

- Report all hazards to Shift Foremen/Undermanager.
- Receive instruction, re-entry authorization and job allocation from Shift Supervisor.
- Communicate with cross shift on task status, hazards and resources required.
- Carry out an inspection of the workplace, documenting it on your “Workplace Inspection” sheet.
- Never go under unsupported ground.
- Ensure PPE is in good order and condition.
- Walk around inspection shall be done before start of the pre-check.
- Pre-check shall be done as per the OEM guidelines (refer. Annexure 2,3 & 3a)

7.3 Deployment of LHD in Mine for various activities

Following list of the activities where in the LHD is used in mine depending on the work activities

- Development face bogging.
- Development face clean up (Bottom Mucking)
- Bogging from DSP (re-handling)
- Bogging of raise boring cuttings.
- Production bogging from stope through- Free bogging
- Line of Sight bogging (Remote bogging)
- Tele remote bogging.
- Dumping into ore pass.
- Bogging from ore pass or waste pass.
- Towing of breakdown HEMM, additional support from rear in case of HEMM towing.
- Road maintenance in UG
- Shifting of raise boring reamers from surface to UG and UG to UG.
- Hook up of Raise bore machine reamer.
- Dismantling of raise bore machine reamer.
- Shifting of raise boring machine and materials.
- Material shifting inside the mine.
- Sump cleaning activities
- Shifting of Mobile plants like exploration machines, DTH, Refuge chamber, Chiller Units etc
- Cleaning of Spillage Muck from Shaft bottom
- Shifting of Cable drums, Ventilation Fans, UG substations- Transformers etc
- LHD retrieval from stopes or ore pass.
- Shifting of HEMM tyre.

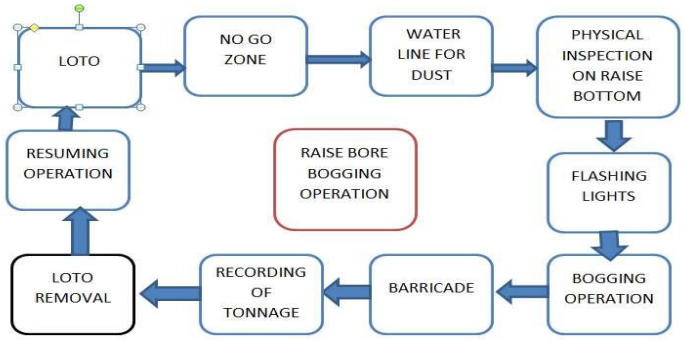
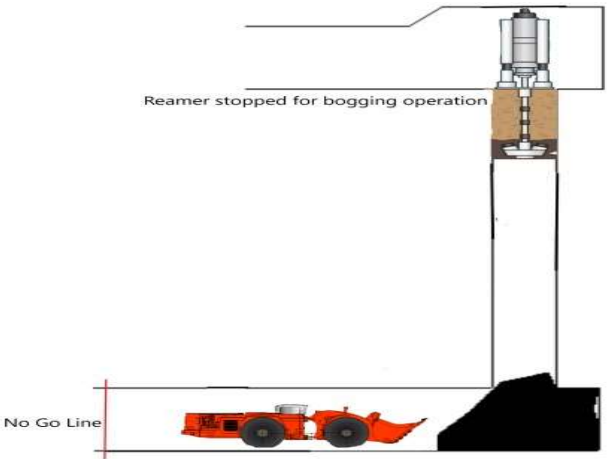
Note: the site management may prepare the SOP as per the deployment of LHD (listed above) with risk assessment process.

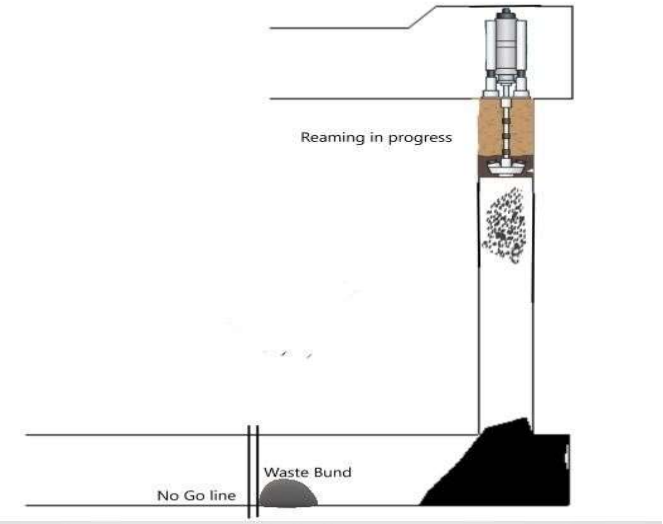
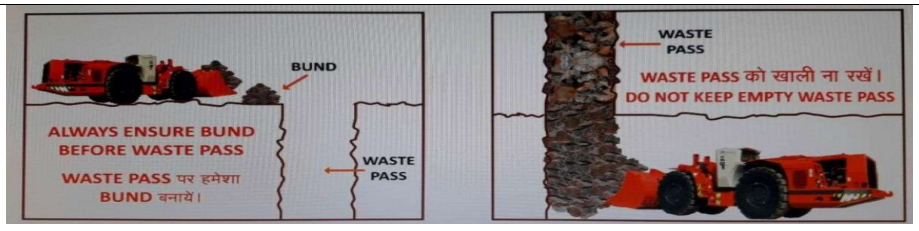
7.4 Standard Guidelines

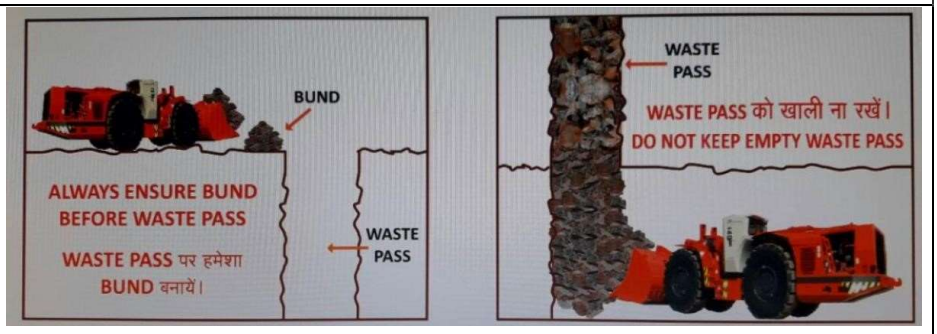
Following table cover the overall standard requirement in critical activities. The other activities wherein LHD is used as a facility, the WI followed by risk assessment shall be done by the team involving for the said work.

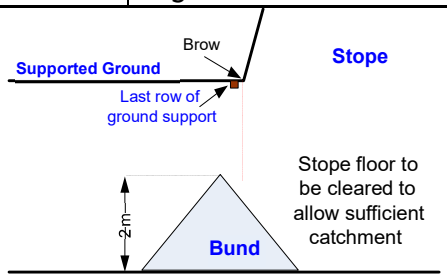
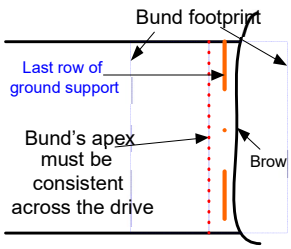
WORK METHODS		
S No	**Process**	**Steps**
1	**Face Inspection**	• The Mining Mate or Mine foreman shall inspect each heading following blasting ***before*** any personnel re-enter.
2	**Enter heading/ Stope to be bogged**	• Tag in at the section tag board as per procedure.
		• Enter the work area and check for any hazards or change in conditions that could be present. Check for any misfires.
		• Do walk around inspection of the development face or stope to be bogged and inspect the loading point/pockets.
		• Carry out JSA. Report to the supervisor if any hazards observed.
		• Ensure adequate ventilation.
		• Install the flasher light at one at development face/stope under bogging and another at loading point.
		• Install additional flasher light in case of dumping in areas where other vehicle movement observed in the movement path of LHD
3	**Development Face Bogging**	• No bogging is to commence until heading has been washed down either by hand or by the water truck.
		• Operator shall do walk around inspection of the area and check for any foreign materials.
		• The cabin of the loader shall not go below the unsupported roof. If fall of ground detect immediately report to the supervisor.
4	**Bottom Cleaning/ face clean up**	• After support completion and face scaling Re-bogging is done.
		• Operators need to inspect the face and depending on the amount of muck method of re-bog is decided whether by Loader or manual (Hoe). When doing Clean up with loader in decline, operator should ensure that no one is present on the face. • Treat the misfire in accordance with Misfire identification and treatment found in the bottom of the face.

5	**Production Bogging from face**	Follow steps as give in Sl.No 2. • In case of free bogging follow the SOP of development bogging. Conduct walk around inspection and look for the foreign materials like rock bolts, wire mesh damaged due to blast. All material shall be • Check for the brow support and ground condition. • Bogging shall be continuing only up to the free bogging condition of the brow, while operator inside the cabin.
6	**Remote (LOS) bogging**	• **No unauthorized person is to enter the work area without contacting the operator and receiving clearance to enter. If anyone enters the work area, stop the machine immediately and apply the park brake.** • **No person including the operator is to approach the line of sight controlled remote machine for any reason unless the park brake has been applied, the engine has been shut down and the transmitter has been isolated.** • **Before mounting a machine to change it from line of sight remote control to manual the operator must apply the park brake.** • **No person under any circumstance is to enter a stope to recover a machine.** • A person must not approach an operator of the remote control loader until it has stopped, engine shut down, transmitter off, the bucket lowered to the ground and the park brake applied.
7.	**Emergency procedures**	The detailed SOP shall be prepared for emergency procedures • Towing the loader. • Towing with the engine running. • Rollovers. • Runaways. • Fire. • Recovery of stuck loader
		The raise bore cutting bogging operation is like the stope bogging. The hazard of mud rush shall be assessed. Following the flow chart for this activity

8.	**Raise Bore cutting Bogging (site Specific SOP shall be prepared by Mines)**	
8a.	**Raise Bore cutting Bogging**	
		Safe Position for raise bore bogging

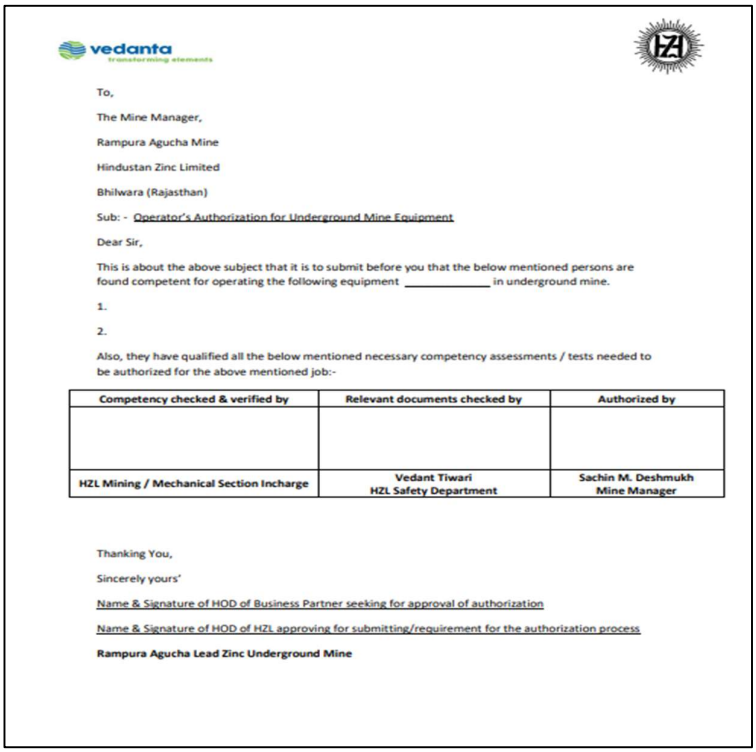
8b.	**Raise Bore cutting Bogging**	 **NO GO Position for raise bore bogging. (Unsafe)**
9	**Tele Remote Bogging**	Site specific standards and SOP shall be developed. SOP no. HZL/RAUG/TRA/056 shall be referred
10.	**Dumping and Removal of muck from ore/waste pass**	 Before dumping in to ore pass a bund of ½ the size of LHD tyre shall be prepared.

9.	**Tele Remote Bogging**	Site specific standards and SOP shall be developed. SOP no. HZL/RAUG/TRA/056 shall be referred.
10.	**Dumping and Removal of muck from ore/waste pass**	 • Before dumping in to ore pass a bund of ½ the size of LHD tyre shall be prepared.
		• In case of permanent dumping in to the ore pass a stopper of concrete or metal shall be constructed at safe distance. Also, an open hole sign shall be installed. • In case of backfilling (CRF) on to the stope, a bund of proper height shall be constructed. • Simultaneous dumping and removal activities shall not be carried out. • Ore pass shall not be opened completely so that the muck will always flow as per angle of repose of material. • Shift end procedures shall be followed.

11.	**End shift Procedures**	 **Section View**  **Top View** • Place a bund after completion of the bogging • Place appropriate signage across the access to the open stope. • Report any defects or damage on the machine to the appropriate supervision. • Submit end of shift reports (pre-starts, workplace inspections) to appropriate supervision. • Park machine in the designated area. Place bucket on the ground, apply park brake and shut down the engine. • The machine shall be parked at a safe distance form the blast danger zone area to avoid damage to the LHD. • Apply shut down procedure. Under no circumstances is a machine to be left running whilst being refueled.

12.	**Training and signaling**	The blind spot training shall be given to the operator and to all the person working in underground. (Replicated picture for HEMM blind spot training)   **Cap lamp signal** training shall be given to all the person inducting in the mine.  Positive communication training through light signaling for crossing the LHD operation area by other LMV/HEMM. This is to eliminate the machine-machine interaction. SOP of radio communication for assessing the LHD operation area.
13.	**Fatigue management**	A system and procedure must be in place for fatigue management of the operator by controlling through duty hours snice in case of remote (LOS) bogging operation, the operator have to ascend and descend the machine twice for bogging a single scoop of LHD.

Annexure. 1. Authorization process form



vedanta
transforming elements

To,

The Mine Manager,

Rampura Agucha Mine

Hindustan Zinc Limited

Bhilwara (Rajasthan)

Sub: - Operator's Authorization for Underground Mine Equipment

Dear Sir,

This is about the above subject that it is to submit before you that the below mentioned persons are found competent for operating the following equipment _____ in underground mine.

1.

2.

Also, they have qualified all the below mentioned necessary competency assessments / tests needed to be authorized for the above mentioned job:-

Competency checked & verified by	Relevant documents checked by	Authorized by
HZL Mining / Mechanical Section Incharge	Vedant Tiwari HZL Safety Department	Sachin M. Deshmukh Mine Manager

Thanking You,

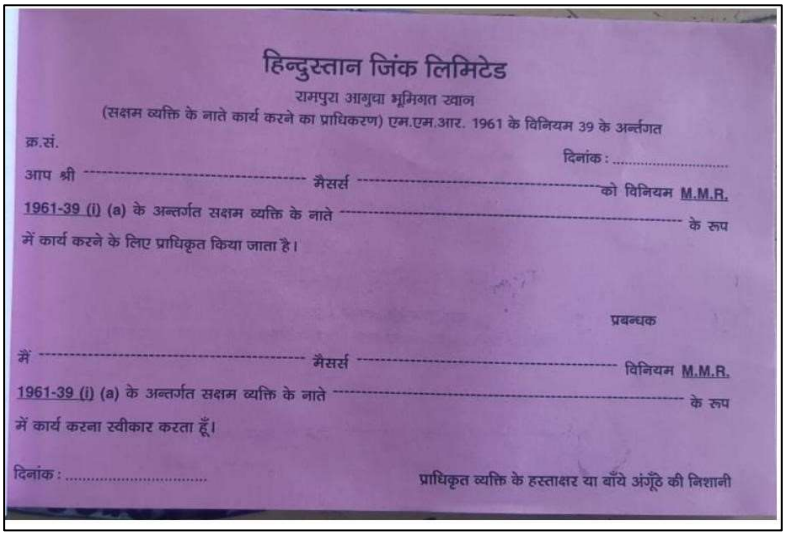
Sincerely yours'

Name & Signature of HOD of Business Partner seeking for approval of authorization

Name & Signature of HOD of HZL approving for submitting/requirement for the authorization process

Rampura Agucha Lead Zinc Underground Mine

Authorization Certificate:



हिन्दुस्तान जिंक लिमिटेड

रामपुरा आगुचा भूमिगत खान

(सक्षम व्यक्ति के नाते कार्य करने का प्राधिकरण) एम.एम.आर. 1961 के विनियम 39 के अन्तर्गत

क्र.सं. दिनांक : .....

आप श्री ---------- मैसर्स ---------- को विनियम M.M.R. 1961-39 (i) (a) के अन्तर्गत सक्षम व्यक्ति के नाते ---------- के रूप में कार्य करने के लिए प्राधिकृत किया जाता है।

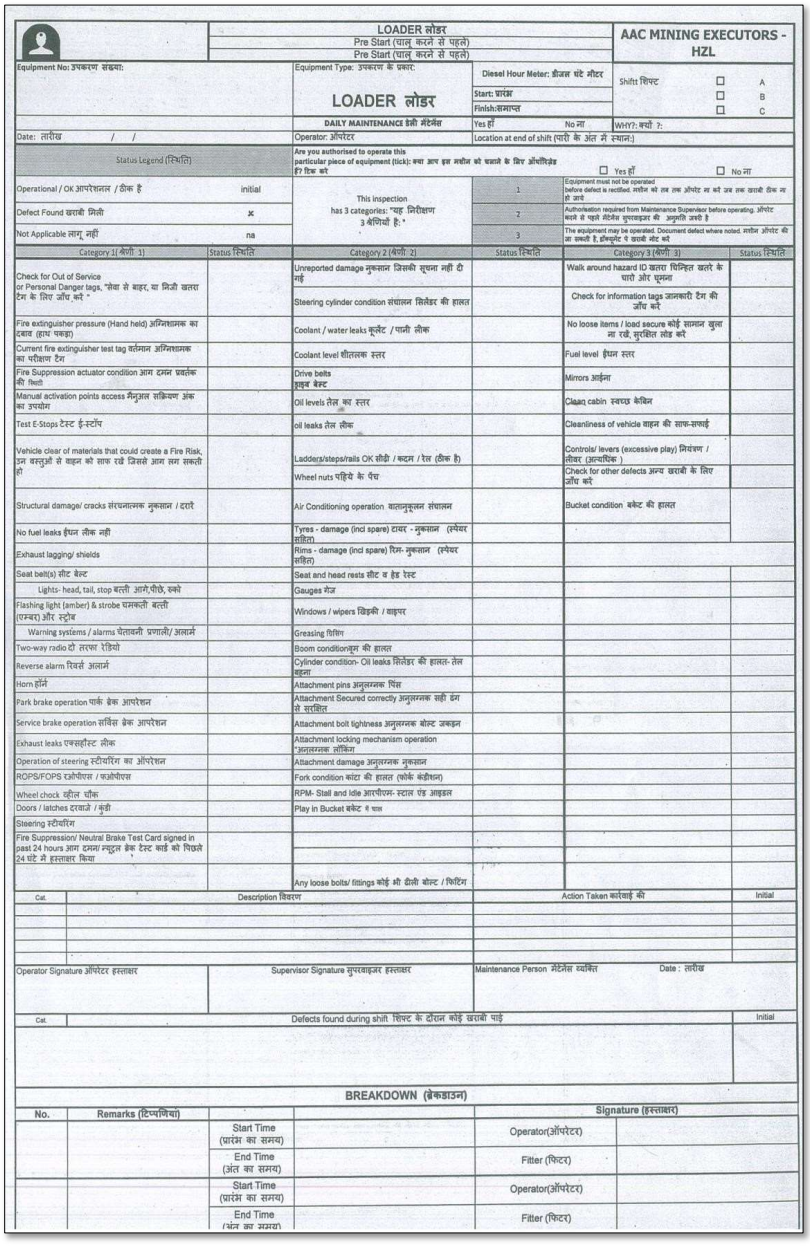
प्रबन्धक

मैं ---------- मैसर्स ---------- विनियम M.M.R. 1961-39 (i) (a) के अन्तर्गत सक्षम व्यक्ति के नाते ---------- के रूप में कार्य करना स्वीकार करता हूँ।

दिनांक : .....

प्राधिकृत व्यक्ति के हस्ताक्षर या बाँये अंगूँठे की निशानी

Annexure 2. Pre-check form (to be filled by operator in consultation with OEM)



LOADER लोडर
Pre Start (चालू करने से पहले)
Pre Start (चालू करने से पहले)

AAC MINING EXECUTORS - HZL

Equipment No: उपकरण संख्या:

Equipment Type: उपकरण के प्रकार:
LOADER लोडर

Diesel Hour Meter: डीजल घंटे मीटर
Start: प्रारंभ
Finish:समाप्त

Shift: शिफ्ट ☐ A ☐ B ☐ C

DAILY MAINTENANCE डेली मेंटेनेंस Yes हाँ No ना WHY?: क्यों ?:

Date: तारीख / /

Operator: ऑपरेटर

Location at end of shift (पारी के अंत में स्थान:)

Status Legend (स्थिति)

Are you authorised to operate this particular piece of equipment (tick): क्या आप इस मशीन को चलाने के लिए ऑथोरिज़ेड हैं? टिक करें ☐ Yes हाँ ☐ No ना

Operational / OK आपरेशनल / ठीक है	initial
Defect Found खराबी मिली	x
Not Applicable लागू नहीं	na

This inspection has 3 categories: "यह निरीक्षण 3 श्रेणियों है: "

1	Equipment must not be operated before defect is rectified. मशीन को तब तक ऑपरेट ना करें जब तक खराबी ठीक ना हो जाये
2	Authorisation required from Maintenance Supervisor before operating. ऑपरेट करने से पहले मेंटेनेंस सुपरवाइजर की अनुमति जरुरी है
3	The equipment may be operated. Document defect where noted. मशीन ऑपरेट की जा सकती है, डीफेक्ट्स पे खराबी नोट करें

Category 1 (श्रेणी: 1)	Status स्थिति	Category 2 (श्रेणी: 2)	Status स्थिति	Category 3 (श्रेणी: 3)	Status स्थिति
Check for Out of Service or Personal Danger tags, "सेवा से बाहर, या निजी खतरा टैग के लिए जाँच करें "		Unreported damage नुकसान जिसकी सूचना नहीं दी गई		Walk around hazard ID खतरा चिन्हित खतरे के चारों ओर घूमना	
		Steering cylinder condition संचालन सिलैंडर की हालत		Check for information tags जानकारी टैग की जाँच करें	
Fire extinguisher pressure (Hand held) अग्निशामक का दबाव (हाथ पकड़ा)		Coolant / water leaks कूलैंट / पानी लीक		No loose items / load secure कोई सामान खुला ना रखें, सुरक्षित लोड करें	
Current fire extinguisher test tag वर्तमान अग्निशामक का परीक्षण टैग		Coolant level शीतलक स्तर		Fuel level ईंधन स्तर	
Fire Suppression actuator condition आग दमन प्रचालक की स्थिती		Drive belts ड्राइव बेल्ट		Mirrors आईना	
Manual activation points access मैनुअल सक्रियण अंक का उपयोग		Oil levels तेल का स्तर		Clean cabin स्वच्छ केबिन	
Test E-Stops टेस्ट ई-स्टॉप		oil leaks तेल लीक		Cleanliness of vehicle वाहन की साफ-सफाई	
Vehicle clear of materials that could create a Fire Risk, उन वस्तुओं से वाहन को साफ रखें जिससे आग लग सकती हो		Ladders/steps/rails OK सीढ़ी / कदम / रेल (ठीक है)		Controls/ levers (excessive play) नियंत्रण / लीवर (अत्यधिक)	
		Wheel nuts पहिये के पेंच		Check for other defects अन्य खराबी के लिए जाँच करें	
Structural damage/ cracks संरचनात्मक नुकसान / दरारें		Air Conditioning operation वातानुकूलन संचालन		Bucket condition बकेट की हालत	
No fuel leaks ईंधन लीक नहीं		Tyres - damage (incl spare) टायर - नुकसान (स्पेयर सहित)			
Exhaust lagging/ shields		Rims - damage (incl spare) रिम- नुकसान (स्पेयर सहित)			
Seat belt(s) सीट बेल्ट		Seat and head rests सीट व हेड रेस्ट			
Lights- head, tail, stop बत्ती आगे,पीछे, स्टॉप		Gauges गेज			
Flashing light (amber) & strobe चमकती बत्ती (एम्बर) और स्ट्रोब		Windows / wipers खिड़की / वाइपर			
Warning systems / alarms चेतावनी प्रणाली/ अलार्म		Greasing ग्रिसिंग			
Two-way radio दो तरफा रेडियो		Boom condition/बूम की हालत			
Reverse alarm रिवर्स अलार्म		Cylinder condition- Oil leaks सिलेंडर की हालत- तेल बहना			
Horn हॉर्न		Attachment pins अनुलग्नक पिंस			
Park brake operation पार्क ब्रेक आपरेशन		Attachment Secured correctly अनुलग्नक सही ढंग से सरक्षित			
Service brake operation सर्विस ब्रेक आपरेशन		Attachment bolt tightness अनुलग्नक बोल्ट जकड़न			
Exhaust leaks एक्सहॉस्ट लीक		Attachment locking mechanism operation अनुलग्नक लॉकिंग			
Operation of steering स्टीयरिंग का ऑपरेशन		Attachment damage अनुलग्नक नुकसान			
ROPS/FOPS रोपीएस / फोपीएस		Fork condition कांटा की हालत (फोर्क केंद्रीकरण)			
Wheel chock व्हील चॉक		RPM- Stall and Idle आरपीएम- स्टाल एंड आइडल			
Doors / latches दरवाजे / कुंडी		Play in Bucket बकेट में पास			
Steering स्टीयरिंग					
Fire Suppression/ Neutral Brake Test Card signed in past 24 hours आग दमन/ न्यूट्रल ब्रेक टेस्ट कार्ड को पिछले 24 घंटे में हस्ताक्षर किया					
		Any loose bolts/ fittings कोई भी ढीली बोल्ट / फिटिंग			

Cat.	Description विवरण	Action Taken कार्रवाई की	Initial

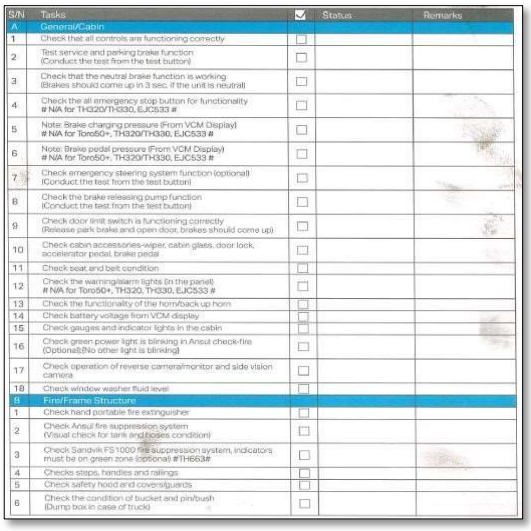
Operator Signature ऑपरेटर हस्ताक्षर | Supervisor Signature सुपरवाइजर हस्ताक्षर | Maintenance Person मेंटेनेंस व्यक्ति | Date : तारीख

Cat.	Defects found during shift शिफ्ट के दौरान कोई खराबी पाई	Initial

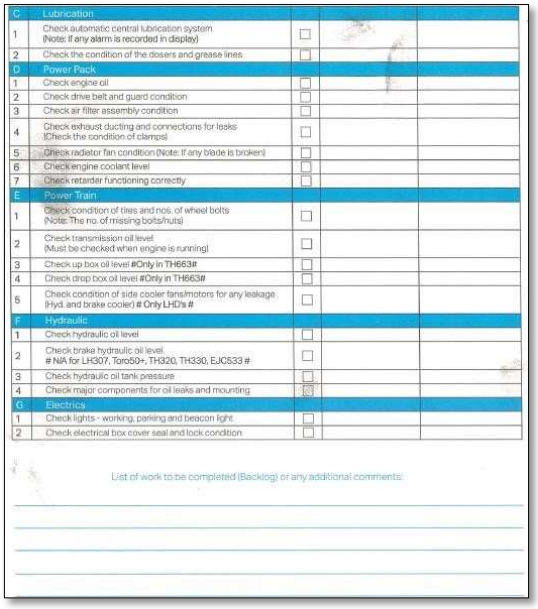
BREAKDOWN (ब्रेकडाउन)

No.	Remarks (टिप्पणियां)			Signature (हस्ताक्षर)	
		Start Time (प्रारंभ का समय)		Operator(ऑपरेटर)	
		End Time (अंत का समय)		Fitter (फिटर)	
		Start Time (प्रारंभ का समय)		Operator(ऑपरेटर)	
		End Time (अंत का समय)		Fitter (फिटर)	

Annexure 3 Pre – check (to be filled by Maintenance Engineer)



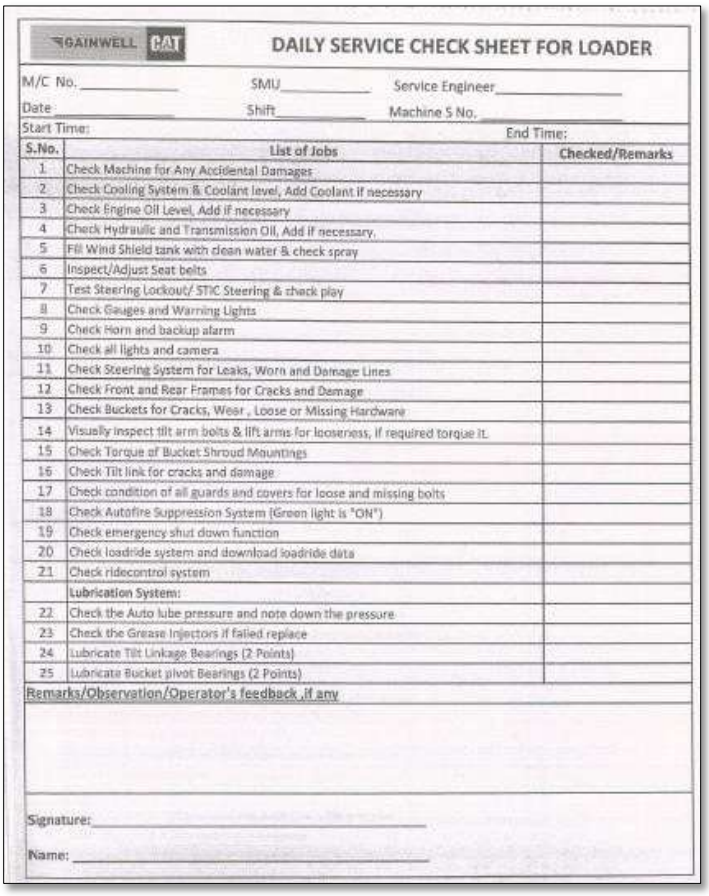
S/N	Tasks	☑	Status	Remarks
A	General/Cabin			
1	Check that all controls are functioning correctly	☐		
2	Test service and parking brake function (Conduct the test from the test button)	☐		
3	Check that the neutral brake function is working (Brakes should come up in 3 sec. if the unit is neutral)	☐		
4	Check the all emergency stop button for functionality # N/A for TH320/TH330, EJC533 #	☐		
5	Note: Brake charging pressure (From VCM Display) # N/A for Toro50+, TH320/TH330, EJC533 #	☐		
6	Note: Brake pedal pressure (From VCM Display) # N/A for Toro50+, TH320/TH330, EJC533 #	☐		
7	Check emergency steering system function (optional) (Conduct the test from the test button)	☐		
8	Check the brake releasing pump function (Conduct the test from the test button)	☐		
9	Check door limit switch is functioning correctly (Release park brake and open door, brakes should come up)	☐		
10	Check cabin accessories-wiper, cabin glass, door lock, accelerator pedal, brake pedal	☐		
11	Check seat and belt condition	☐		
12	Check the warning/alarm lights (in the panel) # N/A for Toro50+, TH320, TH330, EJC533 #	☐		
13	Check the functionality of the horn/back up horn	☐		
14	Check battery voltage from VCM display	☐		
15	Check gauges and indicator lights in the cabin	☐		
16	Check green power light is blinking in Ansul check-fire (Optional)(No other light is blinking)	☐		
17	Check operation of reverse camera/monitor and side vision camera	☐		
18	Check window washer fluid level	☐		
B	Fire/Frame Structure			
1	Check hand portable fire extinguisher	☐		
2	Check Ansul fire suppression system (Visual check for tank and hoses condition)	☐		
3	Check Sandvik FS-1000 fire suppression system, indicators must be on green zone (optional) #TH663#	☐		
4	Checks steps, handles and railings	☐		
5	Check safety hood and covers/guards	☐		
6	Check the condition of bucket and pin/bush (Dump box in case of truck)	☐		



C	Lubrication			
1	Check automatic central lubrication system (Note: If any alarm is recorded in display)	☐		
2	Check the condition of the dosers and grease lines	☐		
D	Power Pack			
1	Check engine oil	☐		
2	Check drive belt and guard condition	☐		
3	Check air filter assembly condition	☐		
4	Check exhaust ducting and connections for leaks (Check the condition of clamps)	☐		
5	Check radiator fan condition (Note: If any blade is broken)	☐		
6	Check engine coolant level	☐		
7	Check retarder functioning correctly	☐		
E	Power Train			
1	Check condition of tires and nos. of wheel bolts (Note: The no. of missing bolts/nuts)	☐		
2	Check transmission oil level (Must be checked when engine is running)	☐		
3	Check up box oil level #Only in TH663#	☐		
4	Check drop box oil level #Only in TH663#	☐		
5	Check condition of side cooler fans/motors for any leakage (Hyd. and brake cooler) # Only LHD's #	☐		
F	Hydraulic			
1	Check hydraulic oil level	☐		
2	Check brake hydraulic oil level # N/A for LH307, Toro50+, TH320, TH330, EJC533 #	☐		
3	Check hydraulic oil tank pressure	☐		
4	Check major components for oil leaks and mounting	☐		
G	Electrics			
1	Check lights - working, parking and beacon light	☐		
2	Check electrical box cover seal and lock condition	☐		

List of work to be completed (Backlog) or any additional comments:

Annexure 3 a. Pre-check (to be filled by Maintenance engineer)



GAINWELL CAT

DAILY SERVICE CHECK SHEET FOR LOADER

M/C No. _____ SMU_____ Service Engineer_____

Date _____ Shift_____ Machine S No. _____

Start Time: End Time:

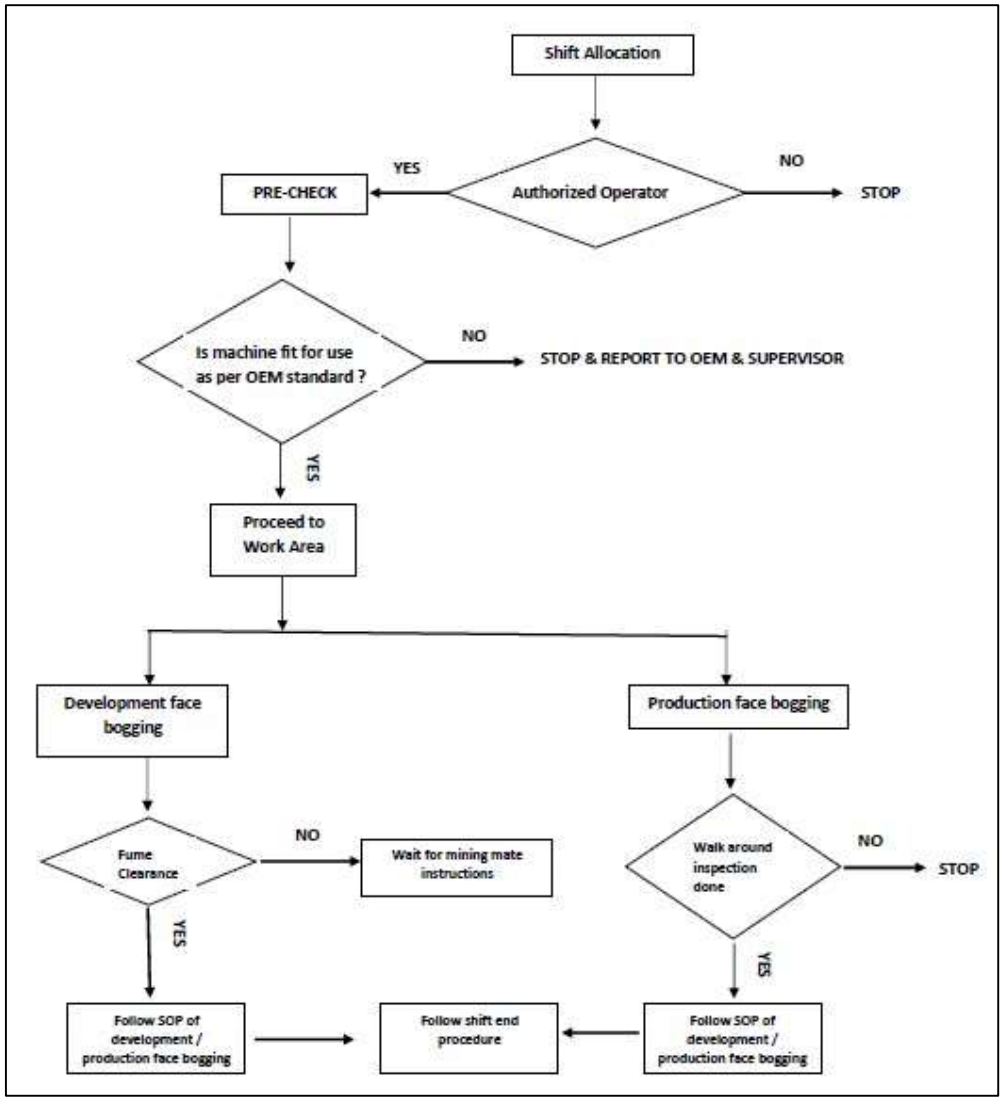
S.No.	List of Jobs	Checked/Remarks
1	Check Machine for Any Accidental Damages	
2	Check Cooling System & Coolant level, Add Coolant if necessary	
3	Check Engine Oil Level, Add if necessary	
4	Check Hydraulic and Transmission Oil, Add if necessary.	
5	Fill Wind Shield tank with clean water & check spray	
6	Inspect/Adjust Seat belts	
7	Test Steering Lockout/ STIC Steering & check play	
8	Check Gauges and Warning Lights	
9	Check Horn and backup alarm	
10	Check all lights and camera	
11	Check Steering System for Leaks, Worn and Damage Lines	
12	Check Front and Rear Frames for Cracks and Damage	
13	Check Buckets for Cracks, Wear , Loose or Missing Hardware	
14	Visually inspect tilt arm bolts & lift arms for looseness, if required torque it.	
15	Check Torque of Bucket Shroud Mountings	
16	Check Tilt link for cracks and damage	
17	Check condition of all guards and covers for loose and missing bolts	
18	Check Autofire Suppression System (Green light is "ON")	
19	Check emergency shut down function	
20	Check loadride system and download loadride data	
21	Check ridecontrol system	
	Lubrication System:	
22	Check the Auto lube pressure and note down the pressure	
23	Check the Grease Injectors if failed replace	
24	Lubricate Tilt Linkage Bearings (2 Points)	
25	Lubricate Bucket pivot Bearings (2 Points)	

Remarks/Observation/Operator's feedback ,if any

Signature: _____

Name: _____

Annexure 4: FLOW CHART OF LHD OPERATIONS IN ALL UNDERGROUND MINES



Annexure 5: RACI Chart

The roles and responsibilities to implement this standard are outlined below:

Activity Description	LHD Operator	Area Supervisor/ Shift In-charge	Planning	Line Organization	Safety	Zone Apex	CSC
Hazard identification related to mucking	R	R/A	-	A	C	-	-
Marking of NO-GO Line	R	R/A	C	A	-	-	-
Install Flasher light	R	R/A	-	A	-	-	-
Preparation of Bund	R	A	C	A	-	-	-
Cleaning of spillage at Bund for Ore/Waste pass	R	A	-	A	-	-	-
Design of Man Cuddy	-	-	R/A	A	-	-	-
Preparation of Man Cuddy	R	R/A	C	A	C/I	-	-
Work Permit if LHD engaged in Material shifting	R	R	-	A	C	-	-
Incident Information	R	R/A	-	A	I	I	-
Audit/Inspection and monitoring for compliance of execution	-	-	-	A	R/C	C/I	I
Relevant risk assessment before execution of job	R	A	-	A	C	-	-
Training & Certification	-	-	-	R/A	C	I	-

R: Responsible

People who are expected to actively participate in the activity and contribute to the best of their abilities.

A: Accountable

The person who is ultimately responsible for the results.

C: Consulted

People who have the specific expertise and can contribute to decision making.

I: Informed

People who are kept informed, but do not necessarily participate in the effort.

End of the document