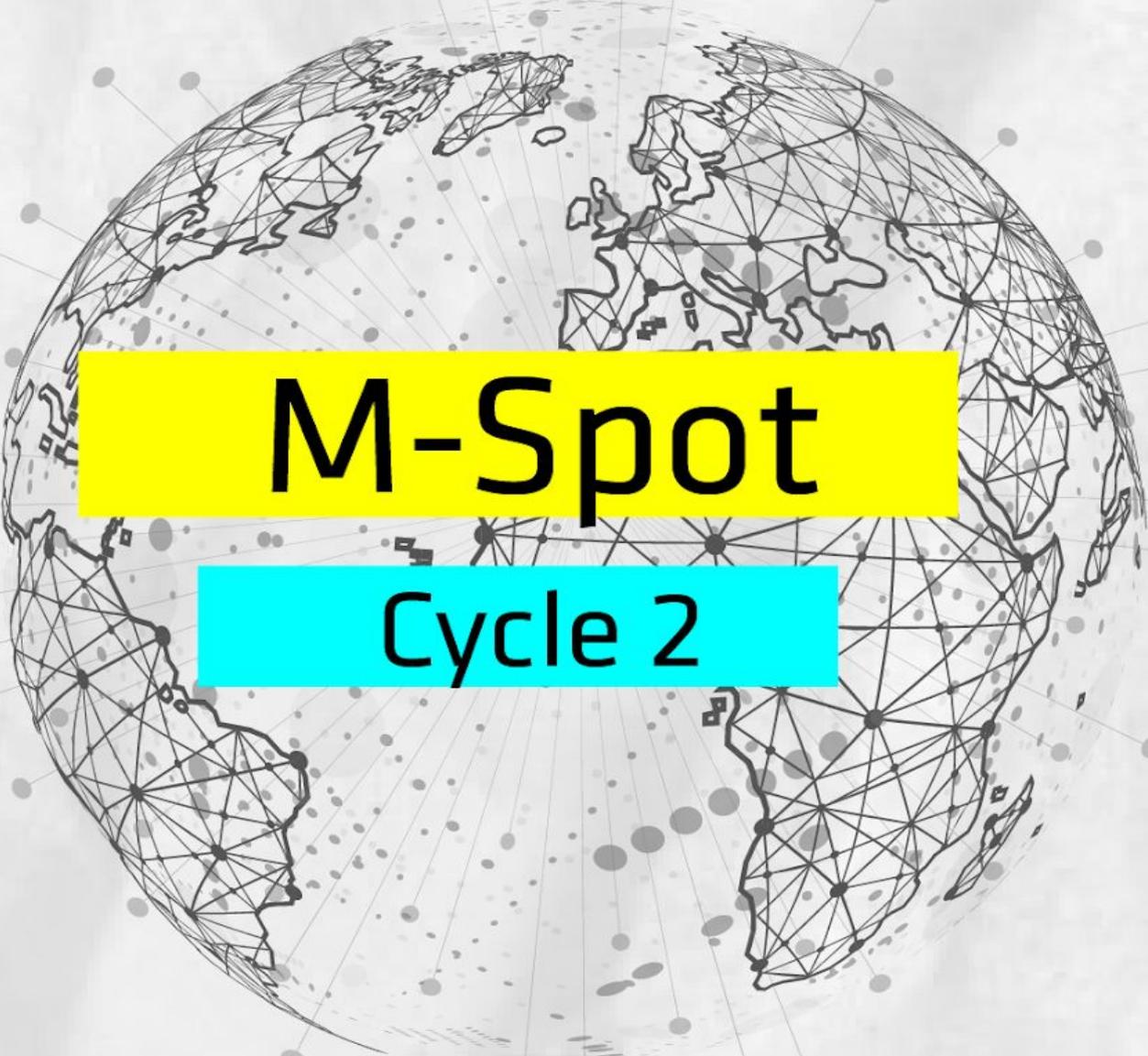


NOTICE



M-Spot

Cycle 2



Public Notice

CHAPTER I - THE PROGRAM

Article 1 - M-SPOT is a customized Mining Hub program to solve unique challenges of mining companies and associated suppliers. In M-SPOT, the mining company or supplier can launch specific challenges and of its exclusive interest, according to the operational or strategic need of that company.

First Paragraph - All the benefits that the Mining Hub offers for M-Start will be maintained for M-SPOT, such as: exclusive ownership of the Intellectual Property (PI) to the STARTUP and sharing of the results achieved in the Proof of Concept (POC), at Demoday phase.

Second paragraph - The program takes place in cycles, with the choice of the benefiting mining company defined in a consensual way among all those associated with the Mining Hub. The areas of the challenges will be defined according to the reality of each company, so they can vary in each cycle.

Article 2 - The second cycle of M-SPOT will be with MINERADORA VALE and will be called M-SPOT Cycle 02. The challenges will be categorized from the following areas: (1) Value Chain, (2) Energy, (3) Health and Safety, (4) Asset Management / Mine, (5) Asset Management / Plant and (6) Geotechnics.

Sole paragraph - The purpose of this Regulation is to define the rules and conditions for participation in the **M-SPOT Ciclo 2** program.



Article 3 - In order to seek innovative solutions for the mining sector, **M-SPOT's** main objective is to prospect and select new projects and ventures ("STARTUPS") and support the development of proofs of concept ("POC") of these with Mining Companies accredited.

Sole paragraph: Participation in the M-SPOT program is aimed at STARTUPS, technology-based companies with the capacity to develop a Proof of Concept with scale potential. A SPIN OFF, a company derived from another organization, whose purpose is dedicated to innovation, may also participate in the program.

CHAPTER II - PROGRAM STAGES

Article 4 - The main stages of **M-SPOT** are presented and detailed in Table 1.

Table 1 - Main stages of the program.

Stage	Detailing
Registrations	The candidate STARTUP must submit its project using the online form available through the website www.mininghub.com.br/programas/mspot . The registration form, as well as the guidelines for submitting proposals, will be published on the MINING HUB social networks.
Selection	The evaluation and selection of proposals will be made by a panel composed by the program management team and Mining Company Vale, according to the rules established in this regulation. More information on the Selection stage can be found in Chapter V of this Public Notice.
Proofs of Concept (POC)	5-month period during which the STARTUP will sign the contract with the Mining Company Vale and also execute the POC, according to the work proposal presented and validated in the Immersion stage carried out during the Selection stage. At the end of the Proof of Concept stage, the STARTUP that has its POC validated will participate in the Demoday, the closing event of the program cycle, in which the STARTUPS present the results of the POCs.



Sole paragraph - The schedule of activities for the main stages of the **M-START** program is available for consultation on the website www.mininghub.com.br/programas/mspot, as well as in ANNEX I of the public notice.

CHAPTER III - CHALLENGES AND MINING COMPANY VALE

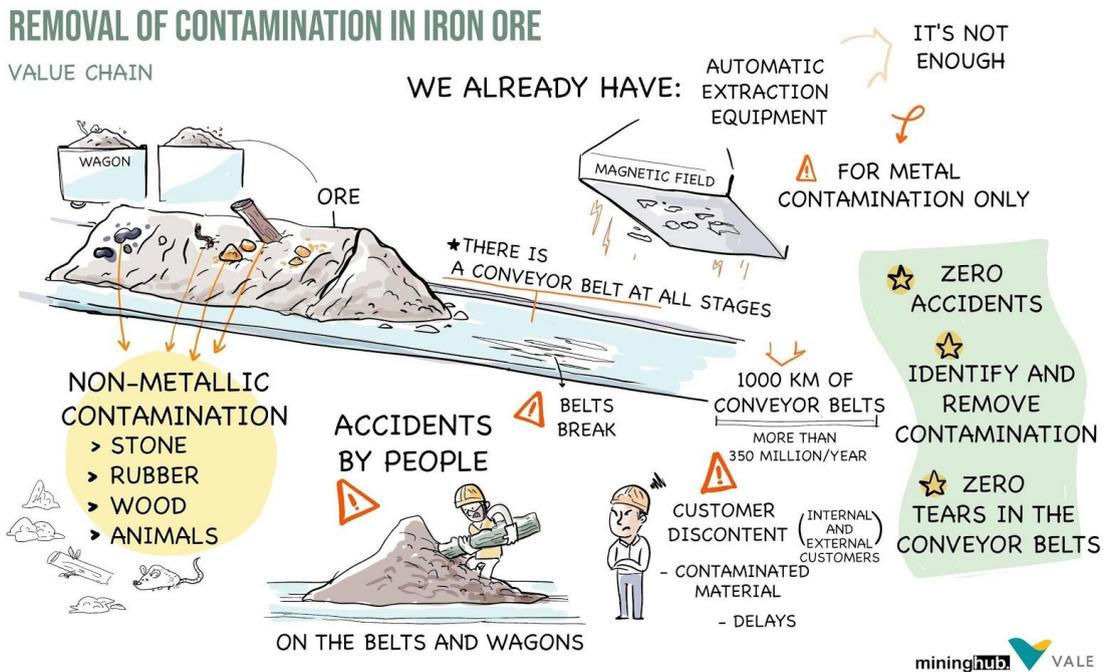
Article 5 - From article 6° To 11° of this public notice, we describe the challenges proposed by the Mining Company Vale, divided by areas. In addition, for each challenge, there is a drawing that aims to promote a better understanding of the key information of each problem. The drawings can be seen in Annex II.

Article 6 - In relation to the area “VALUE CHAIN”, the prioritized challenges for validating the STARTUPS POCs are shown in Table 2.

Table 1 - Value Chain

CHALLENGE	
1.1	REMOVAL OF CONTAMINATION IN IRON ORE
1.2	FORECAST OF THE HUMIDITY LIMIT FOR ORE TRANSPORT WITH DATA PRIOR TO THE PORT
1.3	LOW VARIABILITY QUALITY GUARANTEE IN THE ORE MULTI-BLENDING PROCESS
1.4	HUMIDITY REDUCTION OF THE IRON ORE DURING TRAIN TRANSPORT

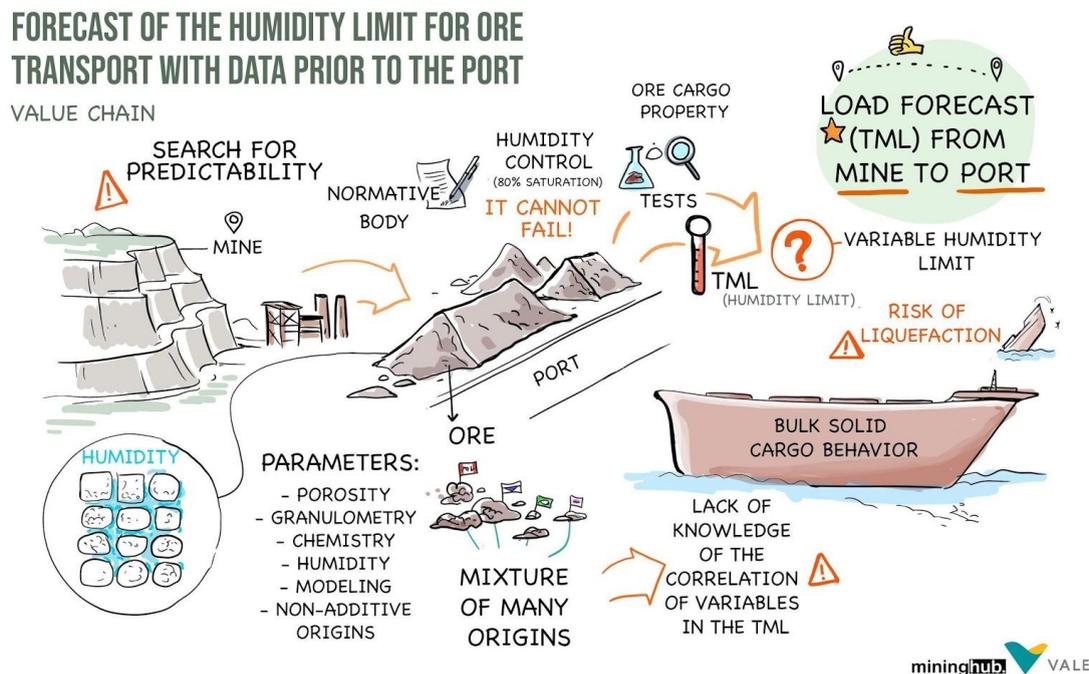
1.1 REMOVAL OF CONTAMINATION IN IRON ORE



Challenge Description

One of the key aspects of Vale's product quality is the presence of diverse contaminant materials. Before being shipped, the last barrier against contamination is the magnetic separator. However, the existence of magnetic separators does not guarantee the elimination of metallic contaminations, and we also have the problem of non-metallic contaminations of different types. The lack of adequate technology prevents the identification of possible contamination in the ore that can end up causing accidents to people, belt tears and damage to Vale's reputation with its customers. For this reason, we need to implement innovative solutions in the identification and extraction of contaminations during the ore handling process. At Vale we have a total length of conveyor belts that exceeds 1000 km. These belts can be up to more than 2m wide and operate at speeds greater than 4m/s and transporting more than 350 million tons of ore per year.

1.2 FORECAST OF THE HUMIDITY LIMIT FOR ORE TRANSPORT WITH DATA PRIOR TO THE PORT



Challenge Description

The maritime transport regulation for iron ore is made in accord to IMSBC (International Maritime Solid Bulk Cargoes) by transportable moisture limit (TML). This measurement must be carried out according to the standardized criteria. For a given iron ore bulk mass, there are chemical and physical properties variations according to its genesis. The combination of different genesis in different proportions sets up the blend to be loaded on ships. With this previous information, we intend to predict the value of TML, with its associated uncertainty, for each blend shaped in the operations. Previous attempts show that the calculation with TML measurements for cargos from different genesis demonstrates that the behavior is not mathematically additive for TML. Also, statistical studies indicate low correlations between physical and chemical parameters and TML. Some technical difficulties



about the theme are related to logistical and legal restrictions, sampling from different sources and characteristics, IT infrastructure, data mining, model updates over mine life, changes in production process and materials of undetermined origin and genesis (External Suppliers).

1.3 LOW VARIABILITY QUALITY GUARANTEE IN THE ORE MULTI-BLENDING PROCESS



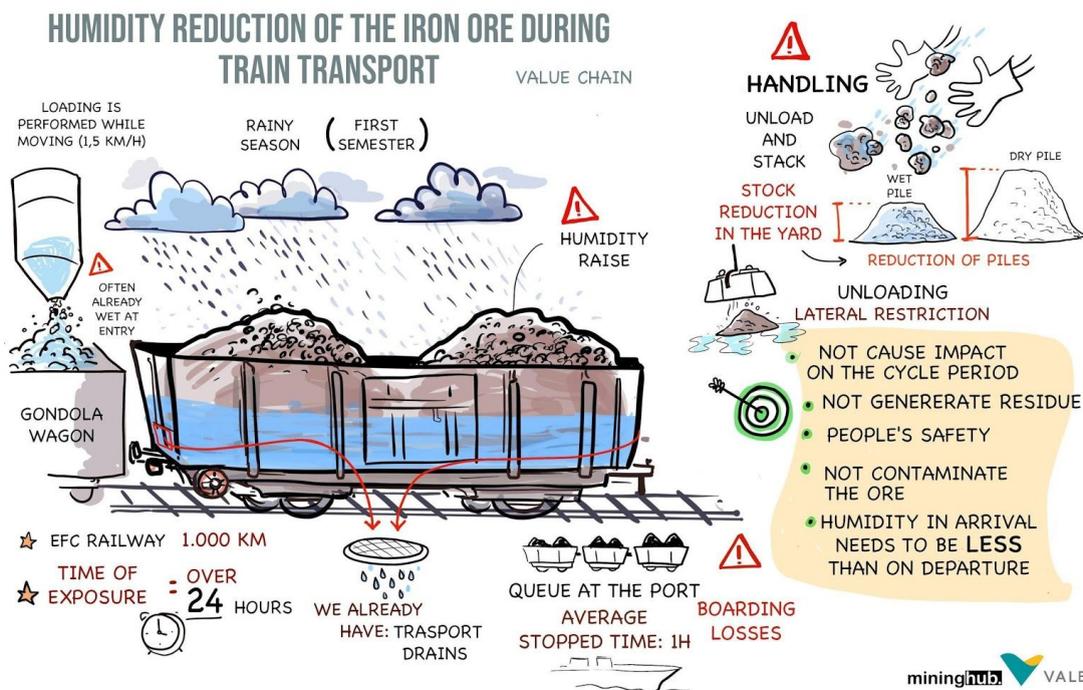
Challenge Description

Multiples ores blending brings a challenge obtaining proper quality variation, technically called quality variability: the lower, the better. Good variability is achieved through 2 main controls: keeping precise and constant ores proportions during blending and guaranteeing these ores will be very well mixed turning them into only one homogenous material. The metric to assess variability is standard deviation for a given number of quality results for a cargo. The challenge to be pursued is achieving



0.20. The main modality for multi-blending is silo blending, in which every ore is solely stored in silo which feeds a conveyor belt that takes the mix to the stockyard. Dosing scales or disk feeder control the blending proportion. Homogenization efficiency depends on aspects such as how many different ores in the blend, how different are their qualities, properties (chemical and physical), moisture content, cohesivity, etc. Also, it depends on how many turn over stages the cargo will go through before being delivered for clients. Turnover stages promote homogenization and happen in transfer chutes mainly. The higher the number of chutes, the better homogenization is.

1.4 HUMIDITY REDUCTION OF THE IRON ORE DURING TRAIN TRANSPORT



Challenge Description

The iron ore extracted in Carajás (PA) is transported to the Port of São Luis (MA) via the EFC railway (Estrada de Ferro Carajás), circulating about 1000km between loading and unloading points. During the rainy season, which occurs in the first half



of each year, the intense rainfall along the railroad increases the humidity of this ore during the average 24 hours of transportation, even with the presence of drains in the box of the wagon. This increase in humidity ends up generating several problems at the harbor, ranging from the difficulty of unloading the wagon to the impediment of loading the ore to the ship for exportation purposes. We look for an innovative solution that, in addition to being environmentally sustainable, without generating waste, and safe, does not impact the time of the train cycle, mainly by not changing the loading time, which is carried out continuously under silos, with speed of up to 1.5 km/h. For the solution, the possibility of quick implementation and minimal intervention on existing assets are also desirable, and it is worth noting that there is almost no lateral clearance between the wagon and the dumpers, the equipment used to unload the ore at the harbor.

Article 7 - In relation to the area “ENERGY”, the prioritized challenges for validating the STARTUPS POCs are shown in Table 3.

Table 3 - Energy

CHALLENGE	
2.1	SUSTAINABLE DISPOSAL OF INDUSTRIAL EQUIPMENT BATTERIES
2.2	OPTIMIZED OPERATIONAL MODE INDICATION TO REAL-TIME ENERGETIC EFFICIENCY



2.1 SUSTAINABLE DISPOSAL OF INDUSTRIAL EQUIPMENT BATTERIES



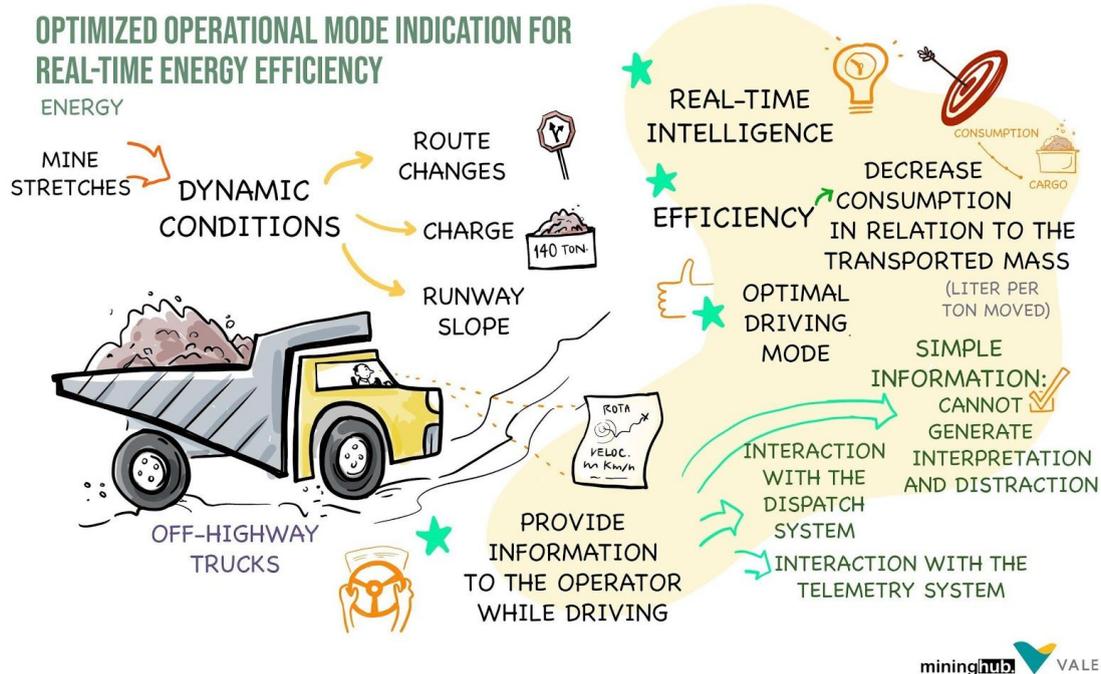
Challenge Description

Several of our zero-emission industrial equipment have significant amounts of battery storage, and the adoption rate for these equipment will increase substantially by the end of the decade, as aligned with our greenhouse gas emissions reduction target. Therefore Vale is proactively looking for sustainable destinations for these batteries in Brazil, either in 'second-life' applications or being recycled. It is important to note that these batteries usually have batteries in both different formats and chemistries than what is found in the automobile sector, and this result that technologies, processes, and decision-making tools have to be created or retooled, in order to maximize value and minimize waste. Some of the lines of research are: is it possible to automate the tests in batteries that are no longer fit for mobile applications, generating data to a downstream decision-making tool that will define what is the best destination (i.e. second-life, recycling)?; the decision-making tool of



the previous item, that will define the destination based on historical data for similar cells and the individual characteristics for that cell; a solution to decouple the battery format and the industrial processes for material recovery for cathode and anodes?; which are the current and future processes that are better suited for these formats and chemistries? As expected, any solution must be scalable, inherently safe, and will have a high degree of autonomy.

2.2 OPTIMIZED OPERATIONAL MODE INDICATION TO REAL-TIME ENERGETIC EFFICIENCY



Challenge Description

Industries all around the globe have been taken public commitments related to GHG emissions reduction. To accomplish that, a series of projects aiming to increase energy efficiency in mining equipment have been taking place and, if succeeded, they could be replicated. Considering that, the optimization of the operation mode of



those equipment is a key point to get better efficiency. This challenge aims to develop a solution that could analyze, in real time, data like engine rotation, engine load, fuel consumption, route, inclination, payload, etc., so that best operational mode could be suggested in real time to the operator considering the dynamic ambient of the mine.

Article 8 - In relation to the area “HEALTH AND SAFETY”, the prioritized challenges for validating the STARTUPS POCs are shown in Table 4.

Table 4 - Health and Safety

CHALLENGE	
3.1	SAFE ACCESS TO MOBILE MINING EQUIPMENTS
3.2	NOISE REDUCTION IN ORE TREATMENT PLANTS
3.3	MITIGATION OF RISKS OF RUNNING OVER PEOPLE IN MAINTENANCE OF FIELD TRAINS

3.1 SAFE ACCESS TO MOBILE MINING EQUIPMENTS

SAFE ACCESS TO MOBILE MINING EQUIPMENTS

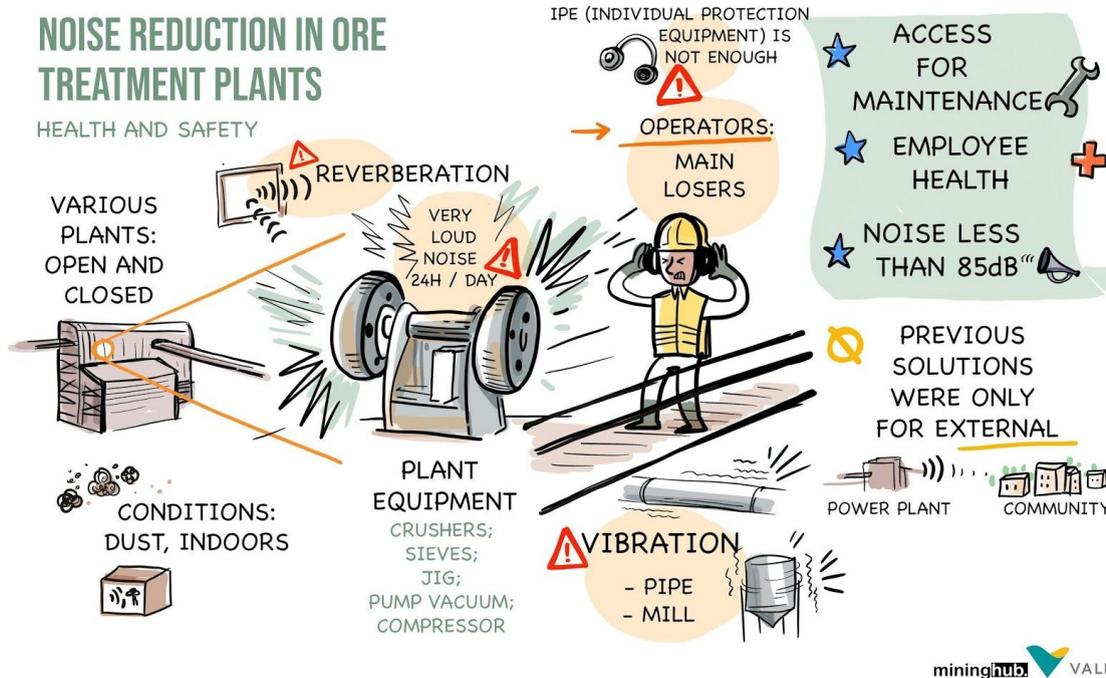
HEALTH AND SAFETY



Challenge Description

The rigs and other equipment used in the drilling operations have parts that should only be accessed by trained and authorized professionals and at the proper time. At the turning on, as well as at the turning off, checking control items or performing preventive or corrective maintenance, access by undue people or/and at inopportune moments can cause damage to the physical integrity of our employees and outsourced. The control of this equipment or parts of the equipment is done by lockout and tagout. In this way, violating the blockages or breaking the rules is easy and happens quite often. The goal of the challenge is to develop or apply technologies that guarantee exclusive access to allowed people and at the proper moments.

3.2 NOISE REDUCTION IN ORE TREATMENT PLANTS



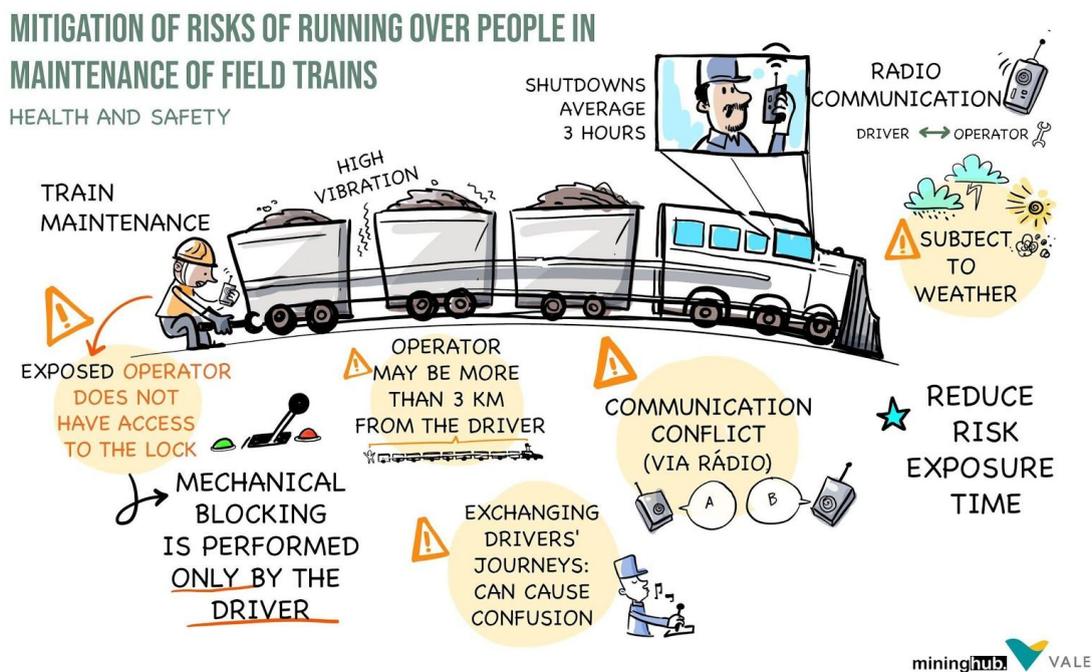
Challenge Description

Vale has approximately 2 thousand employees in operation and maintenance activities at the ore processing plants that are exposed to noise above Vale’s occupational exposure limit. Exposure to noise above this limit can cause hearing loss, which is an irreversible occupational injury. Vale delivers adequate PPE - personal protective equipment that reduces noise exposure to acceptable levels, but PPE is not the preferred form of protection for our employees, since it is dependent on the employee and can cause discomfort during the execution of their activities. The main cause of high noise in the plants is the operation of the crushers and screens, so solutions that reduce noise or close the noise generated by these machines must be evaluated without impacting the production or maintenance processes. It is also possible to evaluate the use of materials that reduce the reverberation of noise in the structures of the plants or the use of drones or robots to



perform activities currently carried out by employees, which require their presence in these environments. The solutions should reduce the noise to which these employees are exposed to below 85dB (A).

3.3 MITIGATION OF RISKS OF RUNNING OVER PEOPLE IN MAINTENANCE OF FIELD TRAINS



Challenge Description

The train traveling or maneuvering in the yard may suffer an unwanted stop due to an unexpected defect that needs interference from a person to remedy the defect, exposing the employee to the risk of personal accident. Authorization to perform the service is made to the driver via radio communication. Train safety procedures are performed by the driver himself. The employee performs maintenance on the train and releases it via radio communication. The situation becomes vulnerable for the maintenance service operator when the driver moves the train without the operator's



permission. The reasons for which the risk exists are basically two: conflict of communication via radio and / or the replacement of the driver at the end of his workday. The distance between the driver and the maintenance worker can reach 3,500 meters depending on the size of the train. That said, so that the man can act on the train, safety procedures were created, such as: turning off the generator field, removing the reversing lever, placing the isolating switch to empty and applying the automatic brake. This procedure is so that the train does not move if the driver uses the accelerator for any carelessness or misunderstanding of orientation due to wrong communication; be it through field, ATC (Automatic Train Control), visual or radio signaling. Something that is not yet safe.

Article 9 - In relation to the area “ASSET MANAGEMENT - MINE”, the prioritized challenges for validating the STARTUPS POCs are shown in Table 5.

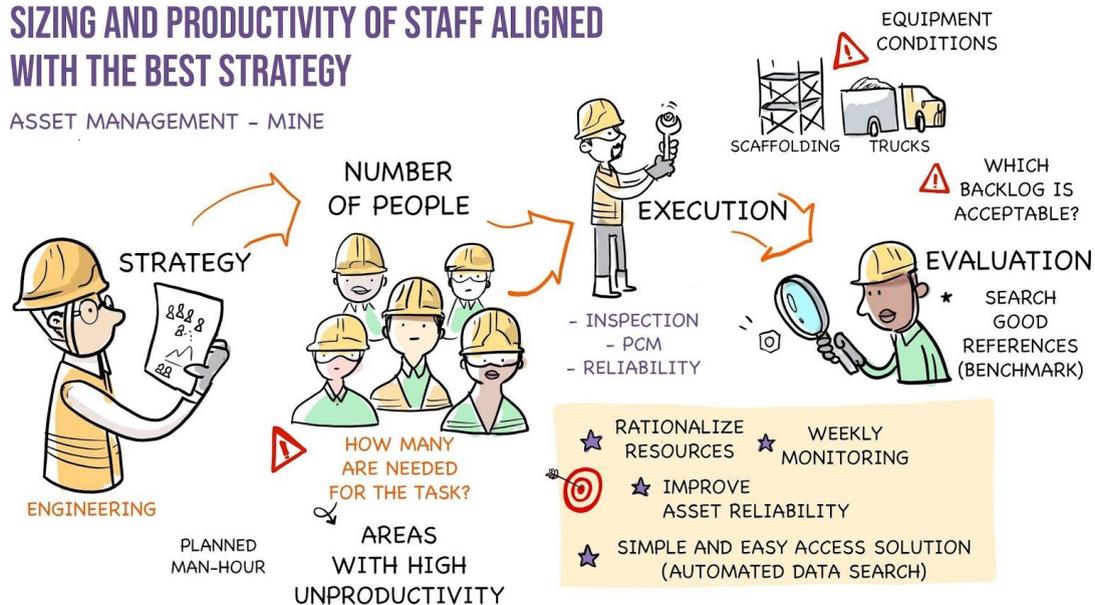
Table 5 - Asset Management - Mine

CHALLENGE	
4.1	SIZING AND PRODUCTIVITY OF STAFF ALIGNED WITH THE BEST STRATEGY
4.2	REAL TIME MANAGEMENT CONTROL

4.1 SIZING AND PRODUCTIVITY OF STAFF ALIGNED WITH THE BEST STRATEGY

SIZING AND PRODUCTIVITY OF STAFF ALIGNED WITH THE BEST STRATEGY

ASSET MANAGEMENT - MINE

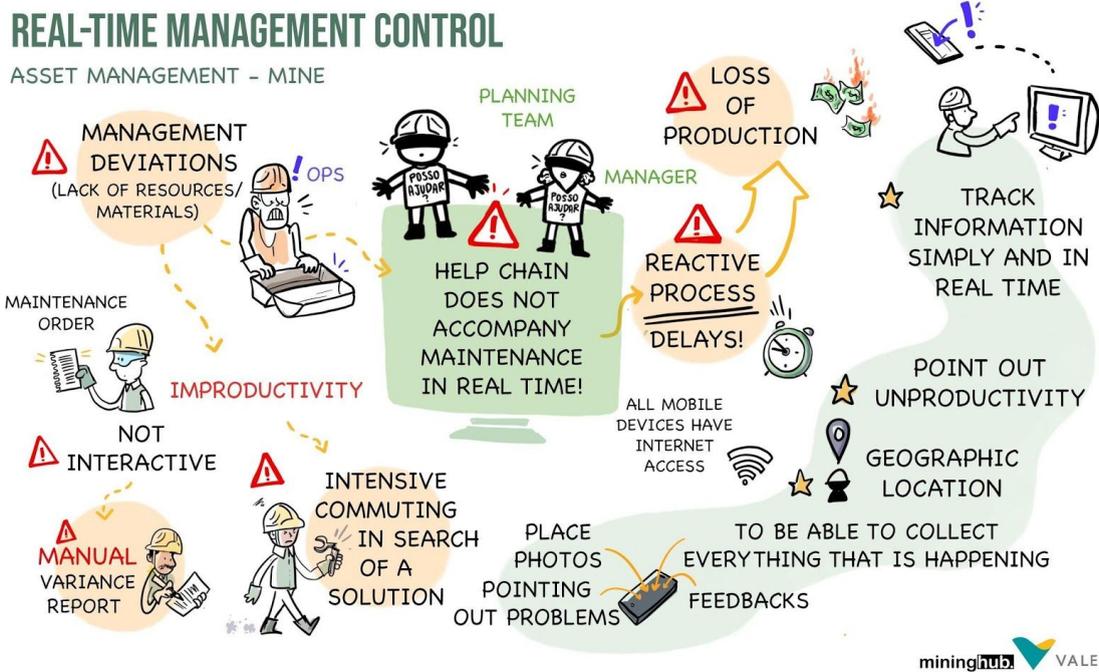


Challenge Description

The installation and company assets management plan mainly aims to assure reliability and to avoid accidents. Annually it is done in all sites and the cash budget to those areas. Such a budget is done in an unpatterned way inside the company which can cause collateral effects, for example the waste of human resources in some places and lack of resources on others, besides the increase of passive management, which increases the risks and also compromises the production program. Even if the quantitative of human resources were correctly estimated, there is no guarantee that the result (production and physical availability X medium time between flaws X safety X environment X community) will be reached. Therefore, the basis of the problem is: to determine the human resource needed, based on the demand for preventive/conditional/corrective maintenance of a given site/management and to

ensure utilization follow-up of such resource checking the budget productivity and result. The solution will be implanted until 5 months after the concept definition and may involve at least 2 mine managements contemplating PCM (Maintenance management and control), inspection, confiability, inspection and execution.

4.2 REAL TIME MANAGEMENT CONTROL



Challenge Description

Maintenance is a fundamental factor to reliability and health of the companies, to the point of determining the success or failure of an operation depending on how this technique is applied. After the engineering team determines the frequency and the tasks to be realized, the activities are planned/programmed and the maintenance teams are divided into work fronts, where each team goes out to realize their attendance. As the distance between the activities is great, the leader of those teams



and the PCM (maintenance management and control) controllers stay without visibility of what is happening. Many times, the PCM and the leadership will be informed of the delay by the end of the day, or the expected end of the activity. This lack of possibility of real time follow-up prevents the performance of the help chains to correct routes and fulfill the programmed activities. These deviations entail risks for the executors, delays in resuming production and consequently losses for the company.

Obs.: If necessary, Vale devices have Wi-fi and 4G access.

Article 10 - In relation to the area “ASSET MANAGEMENT - PLANT”, the prioritized challenges for validating the STARTUPS POCs are shown in Table 6.

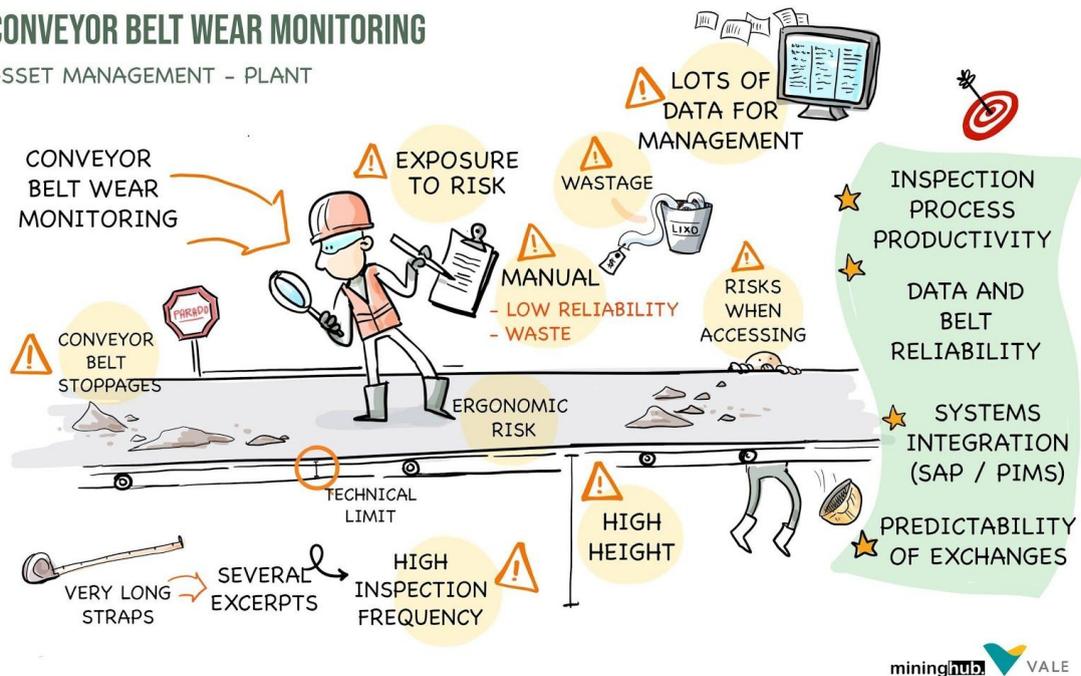
6 - Asset Management / Plant

CHALLENGE	
5.1	CONVEYOR BELT WEAR MONITORING
5.2	PREVENTIVE DETECTION OF NON-CRUSHABLE MATERIAL DURING ORE TRANSPORT

5.1 CONVEYOR BELT WEAR MONITORING

CONVEYOR BELT WEAR MONITORING

ASSET MANAGEMENT - PLANT



Challenge Description

The belt cover wear monitoring process needs to be more reliable and with less exposure to health and safety risks. The technical limit for changing the conveyor belts varies from 2mm to 3mm of thickness. It is expected to obtain reliable data on the belt thickness in mm, with precise analysis of the results, aiming to follow in real time the cover wear rate, with greater predictability about the next changes and cost reduction, fulfilling the technical limit and with interface nearby SAP. The exposure to the very high health and safety risks during this inspection needs to be reduced downwards, through online monitoring of the process and using the risk analysis. With this, the inspector will no longer need to climb on the conveyors exposing himself to risks (ergonomic, falling from a different level, contact with rotating equipment, pressing of hands and fingers, hitting against the structure). In the current solution, ultrasound is used with a specific device, and the data are inserted in a control spreadsheet, without an interface with SAP. With that, data entry failures

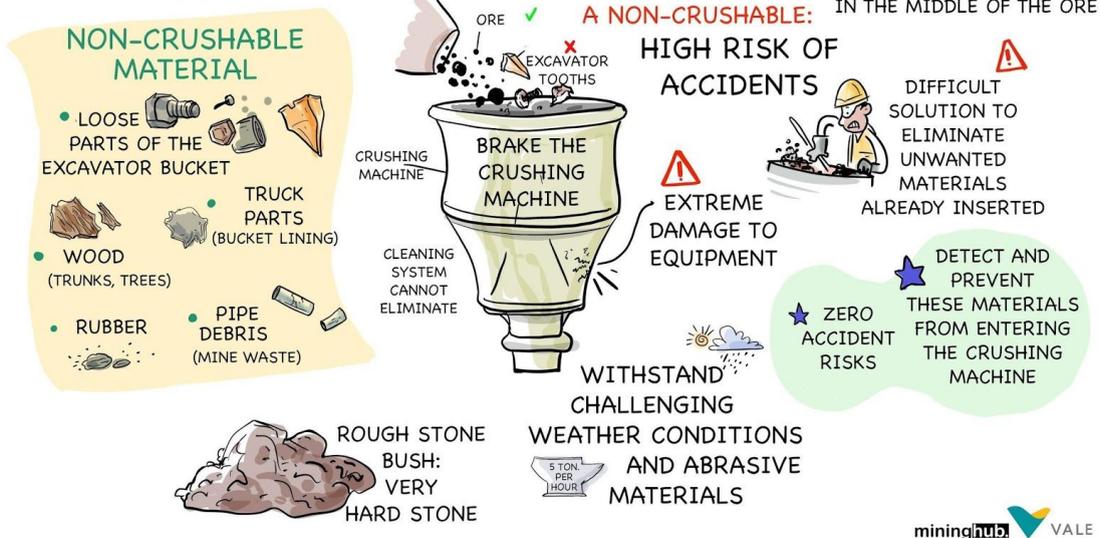


occur, generating low reliability in the process. The difficulty for the proposed solution may be a high cost, due to the large quantity of transporters in the installed park.

5.2 PREVENTIVE DETECTION OF NON-CRUSHABLE MATERIAL DURING ORE TRANSPORT

PREVENTIVE DETECTION OF NON-CRUSHABLE MATERIAL DURING ORE TRANSPORT

ASSET MANAGEMENT - PLANT



Challenge Description

Majoritarly when the fall of a non-crushable in the primary crusher, the motor chain elevates and the safety system stops the crusher immediately. The sudden stop doesn't prevent the truck, which is in the middle of the tipping, from interrupting the discharging, as everything happens too fast. Then, the non-crushable material is under several tons of ore, which makes it difficult to remove. The task takes longer and the exposure of the maintenance and operation teams to the accidents risk becomes more significant. We hope to: eliminate accidents while maintaining the goal of zero accidents for this challenge, because when it occurs it can be fatal.



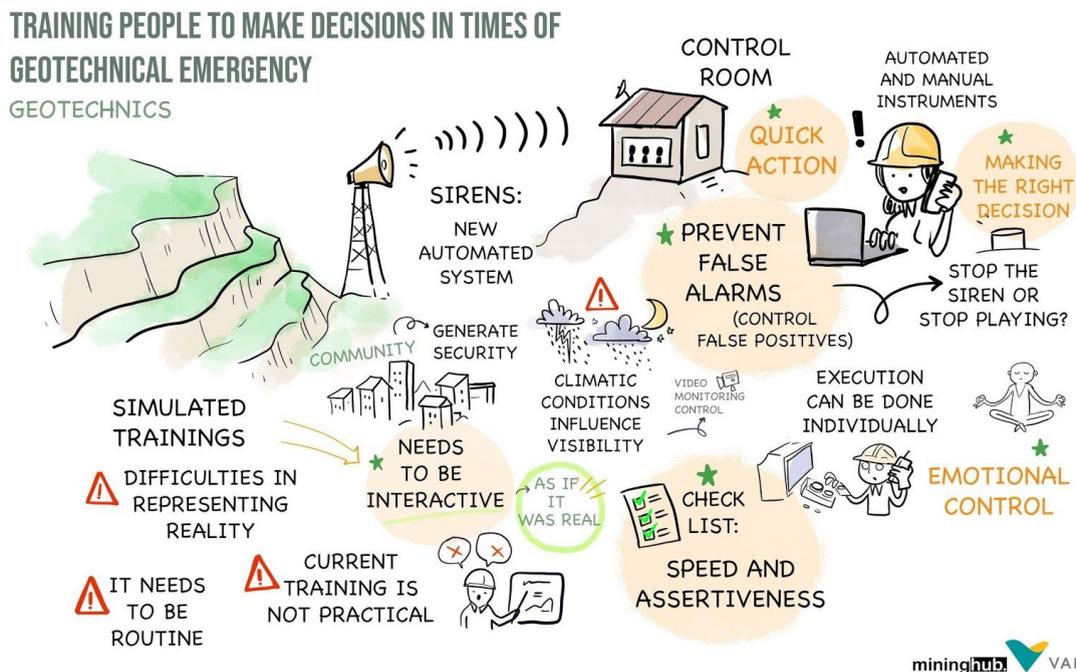
Feed the crushers with material (ore) in granulometry equivalent to the equipment capacity in order to avoid the clogging of the crusher’s feeding silo by boulders that have dimensions above 50 inches. Increase the crusher lifespan by decreasing damage. To avoid non-crushable materials from being transported from the mine and discharged in the crusher’s loading silo (ex.: excavator teeth, tree trunks, rubbers, deactivated pipe parts and various scraps). Decrease the equipment downtime for maintenance. Increase the equipment productivity by receiving the pure material and granulometry compatible with the opening capacity of the crushing chamber. Any device to be installed for such a goal should have the characteristics to support the conditions of the mining environment where the dust, clay, humidity and temperature changes are inherent to the process and also show the possible means of detection of diverse materials as wood, rubber, and steel in the middle of the ore.

Article 11 - In relation to the area “GEOTECHNICS”, the prioritized challenges for validating the STARTUPS POCs are shown in Table 7.

Table 7 - Geotechnics

CHALLENGE	
6.1	TRAINING PEOPLE TO MAKE DECISIONS IN TIMES OF GEOTECHNICAL EMERGENCY
6.2	DEVIATION IDENTIFICATION AND PREDICTIVE ANALYSIS OF GEOTECHNICAL READINGS
6.3	INTEGRATED DATA MANAGEMENT AND CONTROL FOR FILTERED WASTE PILES

6.1 TRAINING PEOPLE TO MAKE DECISIONS IN TIMES OF GEOTECHNICAL EMERGENCY



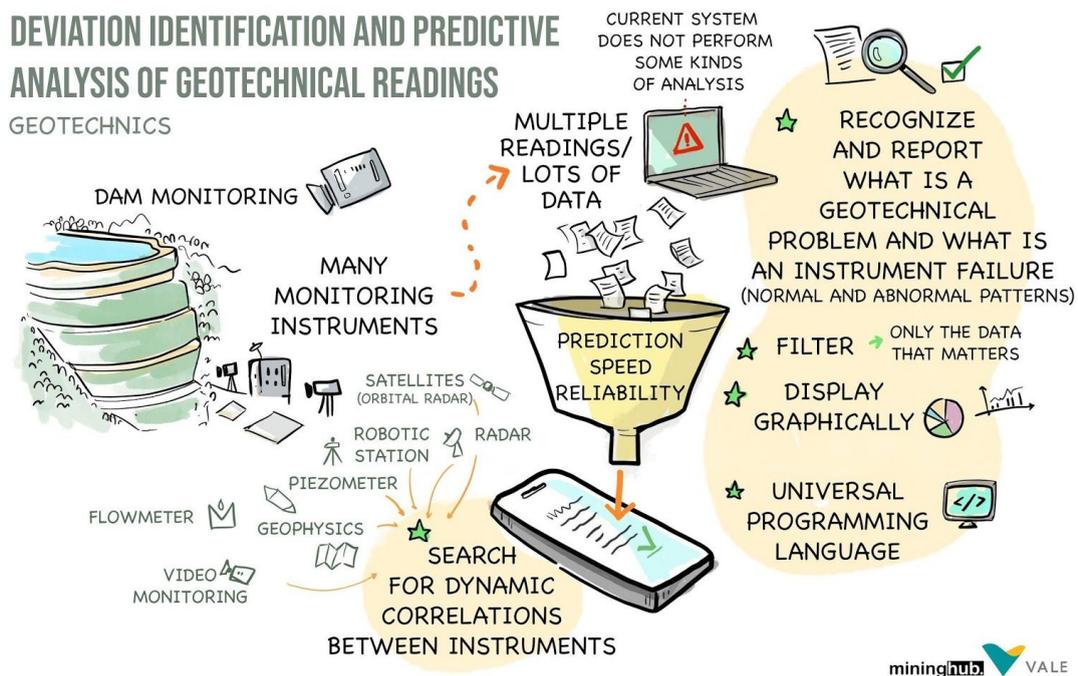
Challenge Description

The geotechnical monitoring centers (GMC) are responsible for monitoring geotechnical structures and carrying out previously established actions for emergencies in those structures. At the moment, VALE is implementing a process for automatically triggering sirens, using devices installed in the field which are interconnected to the sirens. If an automatic activation is about to happen, an alert is sent to the monitoring center and the local operator, who has pre-established actions, needs to make the correct decision in a very quick and assertive way. Thus, our great challenge is to have our operational team technically and emotionally prepared for these activities. We must build a controlled environment in which they can simulate the steps of this process, to create the ability and confidence to perform a task of such importance and responsibility. How might we empower people with



practical training, and without risks, to develop the necessary skills to perform these tasks with safety, quality and productivity? We believe in visual, auditory and synesthetic learning for the individual development of people, and we would like a solution that is able to measure the assertiveness and speed of execution of each step of the process.

6.2 DEVIATION IDENTIFICATION AND PREDICTIVE ANALYSIS OF GEOTECHNICAL READINGS



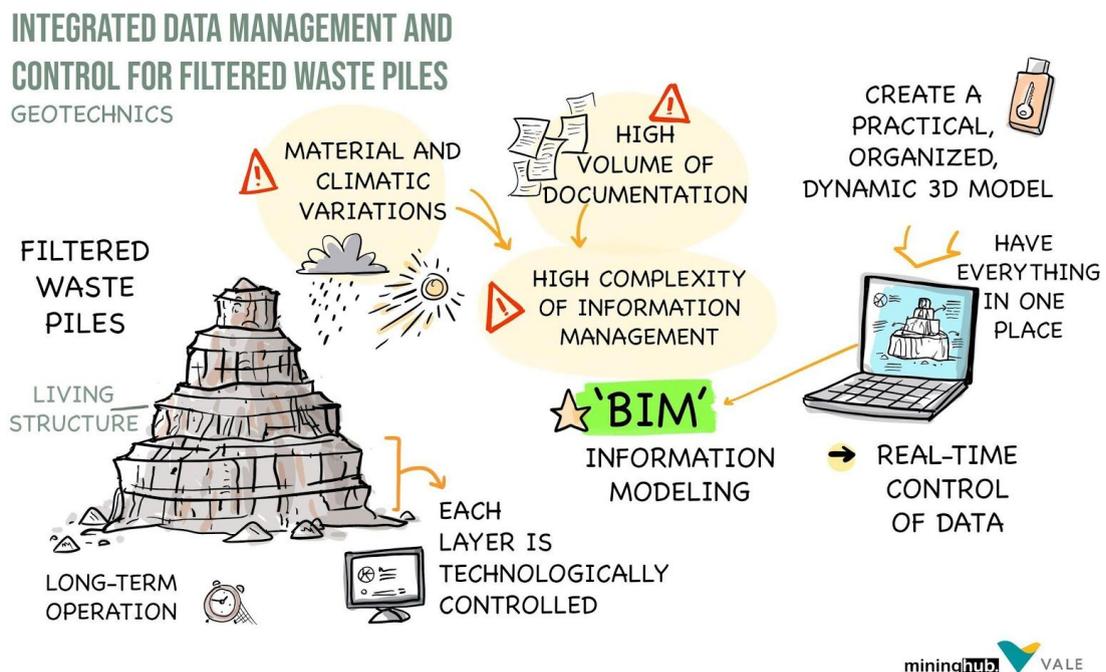
Challenge Description

Dams are monitored by several types of geotechnical instruments. It is essential to define limits to the readings of those instruments, so that it is possible to identify deviations in the performance of the structure. This enables the anticipation of anomalies, the mitigation of deviations and, ultimately, allows the interdiction of structures if necessary. In general, these limits are defined by deterministic methods,



through mathematical models that simulate critical situations. From that, the monitoring reference limits are obtained. However, this method has limitations that hinder its scalability and in some cases is technically incomplete. Thus, the objective of this project is to establish a method for recognizing patterns, identifying and reporting deviations, and defining monitoring reference limits, from dynamic correlations between instruments and predictive analytics. The data analysis method must be agile, secure and scalable, since it will be applied to large volumes and varieties of data, which are generated at an exponential speed. The presentation of results should be instinctive, highlighting the problems identified to the user.

6.3 INTEGRATED DATA MANAGEMENT AND CONTROL FOR FILTERED WASTE PILES



Challenge Description



PDER (Pilha de estéril e Rejeitos) Cianita is designed to receive tailings until 2032, the integrated model of data management and technological control aims to perform a management of a stacking asset. An operation without control of structures such as tailings piles can result in the loss of operating capacity or even the total stoppage of dry operations. In the case of the PDER, we can reach a loss associated with the stoppage of operations up to 30.00 Mt of iron ore production, an impact that is estimated based on Pico's operation , so we hope to achieve with this model a preventive management and control of the pile. Operational Geotechnics already has online systems that contribute to the information management of the complex's geotechnical structures. However, as it is a structure that is being implemented and at the same time in operation, its management becomes extraordinary, not with regard to the agility and dynamism of information, which makes GRG (geotechnical risks management) and GED (Electronic management of engineering documents) platforms somewhat inefficient, due to their delays in document documents and indicators. The biggest difficulty that we will possibly have will be the integration of BIM (Building Information Modeling) data and roots with 3D platforms.

Article 12 - The resources made available by the Mining Company Vale for the validation of the STARTUPS POCs will be agreed through a contract to be signed between the parties at the beginning of the Proof of Concept stage.

First paragraph - Expenses related to participation in the M-SPOT Ciclo 02 program, including transportation, accommodation and food, may have the reimbursement agreed in the contract.

Second paragraph - The disbursement plan of the resources for the POC and reimbursement of expenses will be developed by STARTUPS and validated with the Mining Company Vale during the Immersion stage in the Selection stage.



Third paragraph - If the Mining Company Vale does not have the resources available to carry out the POC and, even so, STARTUP chooses to work with this company, it will not be possible to claim any kind of reimbursement or payment by the STARTUP to the Mining Company Vale in question in the future.

Paragraph Four - Each area of the Mining Company Vale, which is sponsoring M-SPOT Cycle 02 challenges, has a budget that can be used in its entirety or not, in one or more challenges, according to the definitions in the Immersion stage, as described in this present Article 12. The total amount estimated for the realization of the POCs in M-SPOT Cycle 02 is R\$2.400.000,00 (Two million and four hundred thousand reais), with an expected average ticket (upon negotiation) of R\$150,000.00 (one hundred and fifty thousand reais), per challenge.

Article 13 - The place of development of the POC will be defined by the Mining Company Vale, and may undergo changes at the discretion of the program organization.

CHAPTER IV - APPLICATION

Article 14 - The application process for a STARTUP is free and starts with filling and sending the form available through the MINING HUB website www.mininghub.com.br/programas/mspot.

Article 15 - The applicant, when filling out the submission form, must always indicate, in a specific field, the respective theme, challenge with which he/she wishes to perform the POC.

First paragraph - The applicant who has a solution within one of the 6 (six) areas of the program, however, does not fit the challenges prioritized in this cycle or have proposals that are not adherent to one of the 6 (six) areas, but which have innovative



applicability for the mining sector, may register at [M-CONNECT](#) for future opportunities.

Second paragraph - The validation of the POC for a given challenge, throughout the program, will occur between a STARTUP and the specific area of Mining Company Vale, and at the end of the execution cycle, the generated case will be shared with all other areas.

Third paragraph- The STARTUPS are authorized to participate in only one challenge per cycle, even if they are selected for more than one of the challenges launched. If this is the case, STARTUP must choose which challenge / area to follow in the cycle in question.

Article 16 - The application period for M-SPOT Cycle 02 projects is available for consultation on the website www.mininghub.com.br/programas/mspot/ or through other official communication channels of the Mining Hub and the Mining Company Vale.

CHAPTER V - SELECTION

Article 17 - STARTUPS that propose to develop solutions to the challenges presented by the Mining Company Vale with the capacity to validate the POC proposal throughout the Proof of Concept stage will be selected.

Sole paragraph The selection of STARTUPS participating in the program will be carried out by the organizers according to the criteria described in articles 18 to 22. It is also the organizers' right not to select STARTUP for the Proof of Concept stage, if they believe there are no suitable proposals.



Article 18 - The STARTUPS application analysis process consists of the following stages:

(i) STARTUPS classification, considering the “Elimination Criteria, as described in article 20.

(ii) Technical screening of the STARTUPS proposals with the Mining Company Vale of each Challenge. In this stage, the first technical evaluation of the proposals will be made, based on the registration form filled out by STARTUPS and according to the elimination criteria as described in article 20.

(iii) In-person and/ or online interviews, in PITCH format with a 5 minutes duration, in which the STARTUP must present its proposal to the Mining Company Vale of the challenge. Up to three (3) STARTUPS may be selected for the Immersion stage. The elimination criteria are described in article 20.

(iv) Immersion in person and/ or online, in which the objective is to provide STARTUPS with access to the Mining Company Vale and the Mining Hub team to understand details of the challenges and refine the POC proposal, together. In the period of 1 week, the Mining Companies will accompany the pre-selected STARTUPS in the interview stage, providing data and clarifying doubts so that each one of them can refine the scope of the proposed solution for the challenge (s) to which applied for. In the end, up to 01 (one) STARTUP may be selected by the Mining Company Vale to proceed to the Proof of Concept stage. The elimination criteria are described in article 20.

Sole paragraph- The number of STARTUPS selected for the **M-SPOT Cycle 2** Proof of Concept stage will be decided exclusively by the organizers according to the selection criteria.



Article 19 - The result of the selection of STARTUPS will be announced through the **MINING HUB's** communication channels, such as the website www.mininghub.com.br/programas/mspot, Instagram **hubdamineração** and by e-mail until **May 28, 2021**. The date may be changed by **MINING HUB** decision and need.

First paragraph- Registered STARTUPS who are not selected for **M-SPOT** may be invited to make a presentation at the MINING HUB, at the sole discretion of the organizers. The STARTUPS may also register for the [M-CONNECT](#) program.

Second paragraph- STARTUPS not selected in the stages of technical screening, interviews and immersion will receive feedback, exclusively in writing, via email mspot2@mininghub.com.br, within 10 business days after the end of the Selection stage.

Any doubts and/ or requests for clarification regarding the feedback sent, should be made by STARTUPS within 10 working days after the results are announced, by e-mail mspot2@mininghub.com.br, and will be answered exclusively via e-mail within 10 working days after receipt of such e-mail.

CHAPTER VI - SELECTION CRITERIA

Article 20 - STARTUPS will be evaluated according to the following Elimination Criteria:

(i) Legal Registration and Bank Account – The STARTUP or the SPIN OFF must have the National Register of Legal Entities (CNPJ), in case of Brazilian nationality or legal regulation related to their respective nationality, such as, for example, Tax



Identification Number (NIF), in the case of Portugal, as well as a current account in the name of the company for the signature of the contracts;

(ii) Innovation - The solution presented by the STARTUP must have an innovative nature, which demands to be tested in a Proof of Concept. STARTUPS that present solutions commercialized routinely and that do not have any innovative nature will be automatically eliminated from the program (for example: STARTUP that submits a solution already known, already commercialized in scale and already tested in the mining sector) will be eliminated;

(iii) Proposed Themes and Challenges - The solution that does not meet the challenges proposed by the Mining Company Vale, as mentioned in Chapter III, will be eliminated.

(iv) Delivery of Documents - STARTUP that does not present all the documents requested to register new "suppliers", demanded by the Mining Company Vale of the challenge and within the deadlines established during the Immersion will be eliminated;

(v) Classification for the program - We consider STARTUP to be a technology-based company capable of bringing a solution to a challenge in the mining sector and creating solutions with scale potential.

In the previous cycles, the STARTUPS participating in the program had, on average, revenues of less than BRL R\$ 4.8 million. A SPIN OFF, a company derived from another organization, whose purpose is dedicated to innovation, may also participate in the program.

Article 20 - The STARTUPS will be evaluated by the Mining company Vale, during the Screening of Proposals and Online and/ or Face-to-Face Interviews, according to the "Classification Criteria" presented in Table 8 below.



Table 8 - Classification criteria.

CRITERION	OBJECTIVE
Team	Assess the team's ability to develop the solution and leverage the business.
Technological potential	Assess the effectiveness of the technologies used in the solution and their degrees of maturity.
Proposed solution	Assess whether the solution meets the demand(s) of the mining companies.
Scalability	Assess whether the solution allows scalability for companies associated with the Mining Hub
Potential impact	Assess the potential impact of the solution on the mining companies (financial, social, environmental, etc.)

Sole paragraph - The solutions will be evaluated with grades from 1 to 5 in each of the criteria described in Table 8. The final grade of the STARTUP will be given by the average of the grades in each criterion.

Article 22 - During the Immersion stage, the participating STARTUPS will be asked to prepare additional documentation related to the execution of the proposed POC (physical and financial project schedules, commercial proposal and other documentation). The selection of STARTUP for the Proof of Concept stage will be carried out based on the documentation presented.



CHAPTER VII - DURATION OF THE M-SPOT PROGRAM

Article 23 - The schedule with the main milestones of the **M-SPOT** program is available on the MINING HUB website (www.mininghub.com.br/mspot) as well as in Annex I.

CHAPTER VIII - OBLIGATIONS AND RESPONSIBILITIES

Article 24: The obligations of STARTUPS are:

- (i). Comply with all the provisions contained in this Regulation;
- (ii). Participate in the actions provided for in each stage of **M-SPOT**, as well as provide all the necessary information and documents required by the Mining Company Vale and or by the Mining Hub team;
- (iii). Mandatory participation in the events and activities of the **M-SPOT Cycle 2**, with at least 01 (one) representative of the STARTUP;
- (iv) The STARTUP, when enrolling in this program, declares that it does not use and does not have, in its entire production chain, directly or indirectly, slave labor, in degrading conditions, workers subjected or forced to illegal conditions under the employer's domain, work by under 16 (sixteen) years, except as an apprentice from the age of 14 (fourteen), as established in article 7, item XXXIII of the Federal Constitution, as well as does not allow any type of discrimination and respects freedom of association, under penalty of being immediately eliminated by the **MINING HUB**, without the need to send prior notification, being the STARTUP, in case of violation of this clause, subject to the compensation of losses and damages caused and the penalties provided for by law;
- (v) The STARTUP, when registering for this program, declares to fully observe Law nº. 12,846/ 2013 ("Brazilian Anti-Corruption Law") and declares that is aware of all



the terms and definitions provided for in the Brazilian Anti-Corruption Law, which define as a harmful act to promise, offer or give, directly or indirectly, an undue advantage to a public agent or third person related to it, among others. In case of violation of said Law, it will be responsible for any losses, damages or liabilities caused, in addition to the penalties provided by law.

CHAPTER IX - TERMINATION OF THE RELATIONSHIP BETWEEN STARTUPS AND THE MINING COMPANY VALE AT M-SPOT CYCLE 2

Article 25 - The **M-SPOT** program relationship with the STARTUPS will be considered terminated upon prior notification, in the following cases:

- (i) Elimination in the selection stages;
- (ii) End of program duration;
- (iii) If there is a violation of any clause of this Regulation;
- (iv) If the organizers change significantly, the main characteristics of M-START and the STARTUP do not agree with such changes;
- (v) If the insolvency, bankruptcy or judicial recovery of STARTUP and its members is verified;
- (vi) If there is the STARTUP's temporary activity assignment;
- (vii) By the STARTUP's duly justified initiative;
- (viii) By the MINING HUB's duly justified initiative;
- (ix) By the SPONSORING MINING COMPANY's duly justified initiative;

First paragraph: The STARTUP that does not have time available or does not respect attendance during the program will be eliminated, which will be carried out in person, at the headquarters of the Mining Hub and/ or associated Mining Companies, or online. The eliminated Startup will be the sole and exclusive responsible for any costs spent in this period.



Second paragraph: If the Mining Company Vale chooses to leave the program, it must present its written justification to the Mining Hub Board.

Third paragraph: Any financial expenses incurred by the STARTUP or the Mining Hub, from the Immersion stage, within the period referring to that cycle in which Mining Company Vale withdrew, must be fully refunded by the mining company that gave up to the first two mentioned in this paragraph.

CHAPTER X - POSSIBLE BENEFITS FOR THE SELECTED STARTUPS

Article 26: The following benefits may be available for the STARTUPS selected for the Proof of Concept stage:

- Possibility of investment to develop the projects together with the Mining Company Vale to validate the POCs;
- Access to the infrastructure and teams of the Mining Company Vale;
- Coaching and mentoring with renowned professionals in the mining sector and STARTUPS;
- Working together with the Mining Hub and Neo Ventures team;
- STARTUPS development methodology: training, technical visits, professionalization of management and growth;
- At the end of the program, and at their sole discretion, the Mining Company Vale, if they consider it feasible for their business, may invest in the solutions application in operational scale, as well as establish partnerships to seek funding, purchase or distribution of the STARTUPS products and services.



Article 27 - A physical space may be made available, with prior authorization from the Mining Hub team, during the Proof of Concept stage, which must be used exclusively to carry out the activities provided for in this Regulation.

First Paragraph - The physical space made available must be used by the STARTUPS selected in accordance with the rules of the Mining Hub, and the transfer of the right of use is not permitted.

Second Paragraph - STARTUPS representatives are responsible for keeping the available space, equipment and furniture in all common areas in good condition.

Third Paragraph- The space section for STARTUPS is subject to the current sanitary conditions and due precautions related to epidemiological control. If necessary, the program can be carried out exclusively online - at the discretion of the Mining Hub Team.

CHAPTER XI - GENERAL PROVISIONS

Article 28- It is clear and established forthwith that participation and/or selection in the **M-SPOT CYCLE 2** does not constitute any kind of bond, operational agreement, joint venture or association between the participating STARTUP (selected or not), the **Mining Hub** and others involved in the program. The participating STARTUP (selected or not) and the others involved in the program are independent entities, that no provision of this Regulation or the program should be interpreted to create any corporate, labor or tax bond between the parties and that there is no or there will be no solidarity or subsidiarity, of any kind, between the parties.

Article 29 - It is clear and established from now on that participation in the program and eventual signing of a contract with the Mining Company Vale does not generate any kind of employment relationship. The STARTUP undertakes to exempt the



Mining Hub and others involved from any liability in labor/social security claims eventually proposed by any of its employees, as well as to bear all costs incurred in such claims, including, but not limited to, attorney's fees.

Article 30 - It is clear and established from now on, that the management team may change this Regulation at any time, if needed for the good and regular progress of the Program established here.

Article 31 - It is clear and established from now on that if there is any doubt regarding these Regulations, the MINING HUB is available to answer them by e-mail. mspot2@mininghub.com.br.

Article 32 - The participants grant Mining Hub, without exclusivity, the right to use their image, text and/or voice in any type of material free of charge. In return, the Mining Hub undertakes to use the image of participants without making changes to the physiognomy, and also not to use the image in a derogatory way, or that may represent in any way, some kind of violation of moral damage.

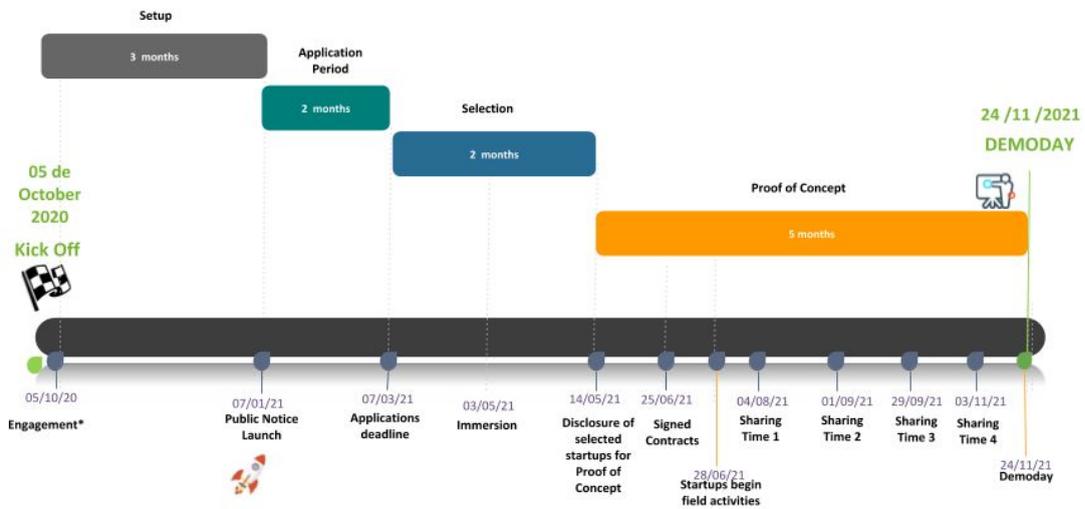
Article 32 - Responses to the registration form can be written in Portuguese or English.

Article 34 - The email mspot2@mininghub.com.br is established as the program's official communication channel.



ANNEX I

M-SPOT Cycle 2

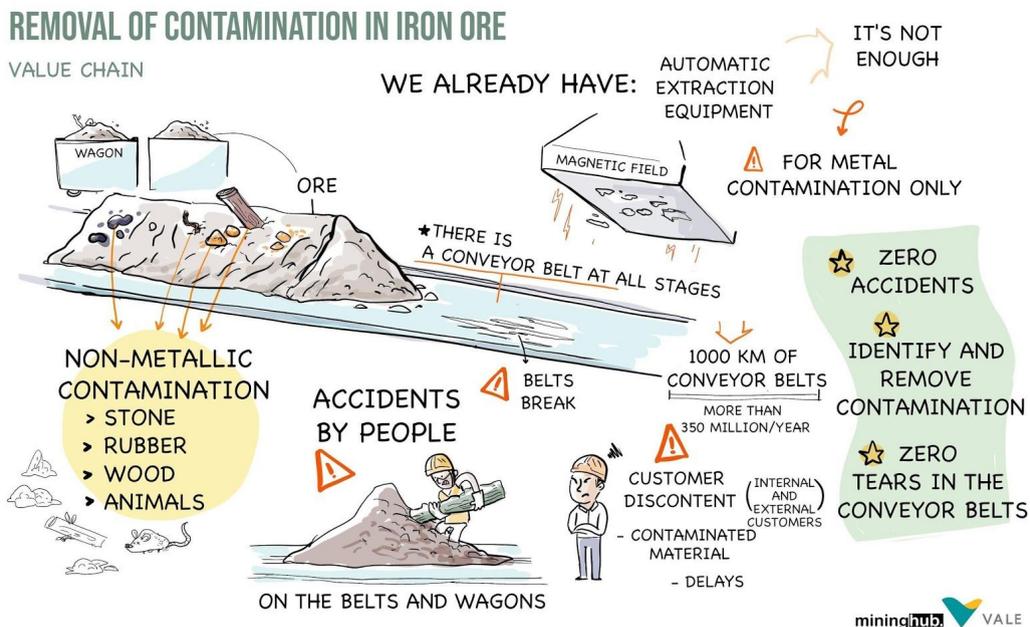




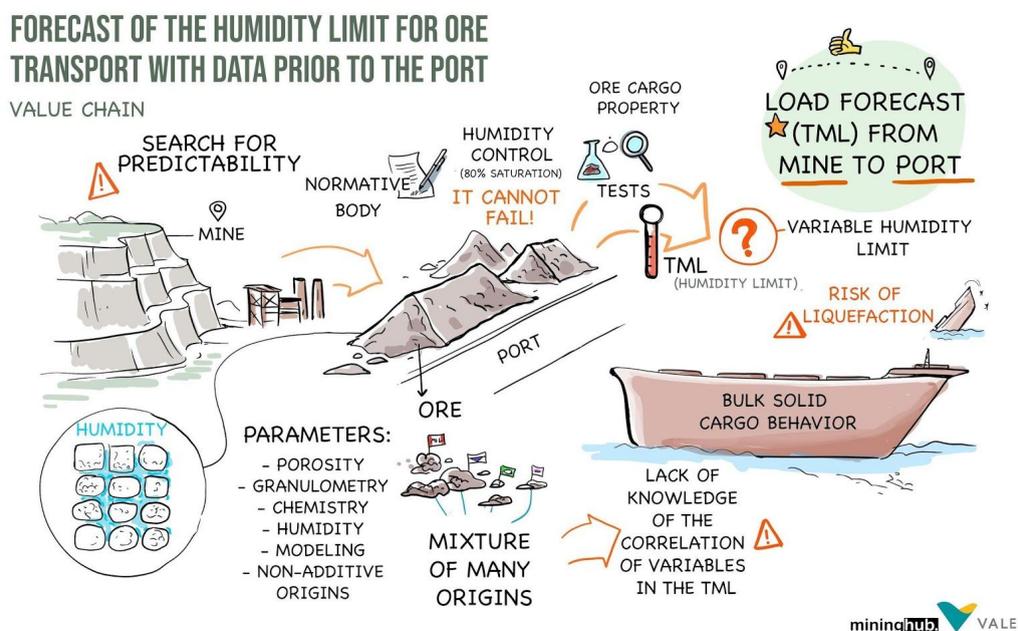
ANNEX II - CHALLENGES INFOGRAPHICS

1 VALUE CHAIN

1.1 REMOVAL OF CONTAMINATION IN IRON ORE



1.2 FORECAST OF THE HUMIDITY LIMIT FOR ORE TRANSPORT WITH DATA PRIOR TO THE PORT





1.3 LOW VARIABILITY QUALITY GUARANTEE IN THE ORE MULTI-BLENDING PROCESS

LOW VARIABILITY QUALITY GUARANTEE IN THE ORE MULTI-BLENDING PROCESS

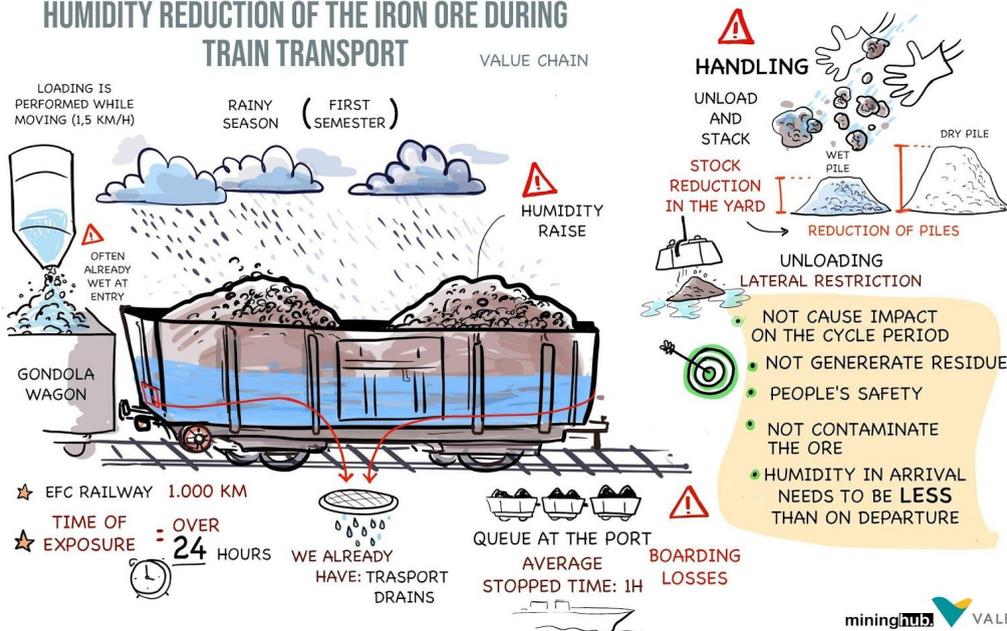
VALUE CHAIN



1.4 HUMIDITY REDUCTION OF THE IRON ORE DURING TRAIN TRANSPORT

HUMIDITY REDUCTION OF THE IRON ORE DURING TRAIN TRANSPORT

VALUE CHAIN



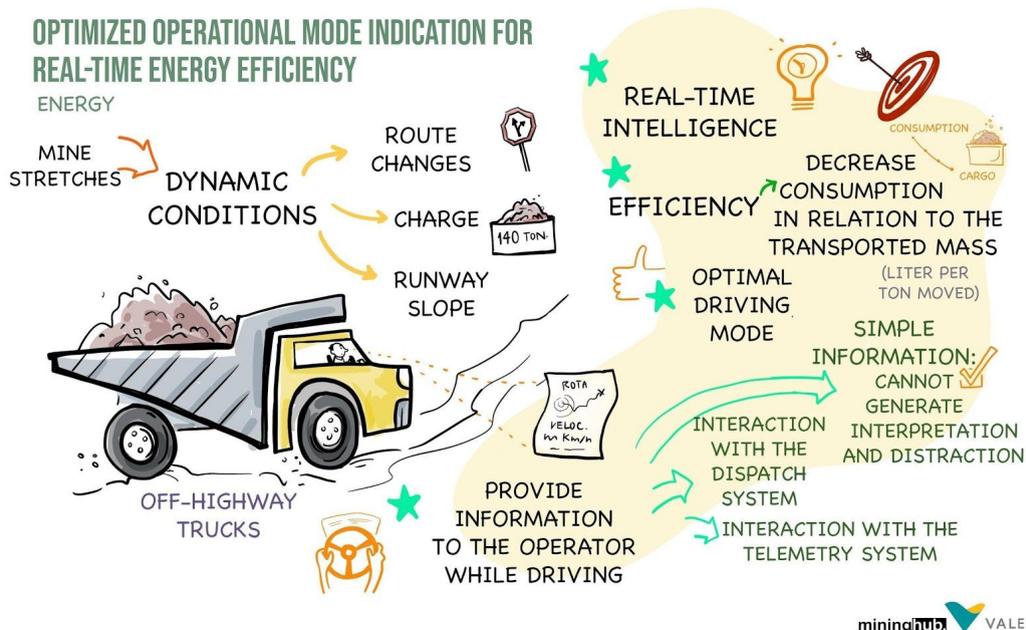


2 ENERGY

2.1 SUSTAINABLE DISPOSAL OF INDUSTRIAL EQUIPMENT BATTERIES



2.2 OPTIMIZED OPERATIONAL MODE INDICATION TO REAL-TIME ENERGETIC EFFICIENCY



3 HEALTH AND SAFETY

3.1 SAFE ACCESS TO MOBILE MINING EQUIPMENTS

SAFE ACCESS TO MOBILE MINING EQUIPMENTS

HEALTH AND SAFETY



3.2 NOISE REDUCTION IN ORE TREATMENT PLANTS

NOISE REDUCTION IN ORE TREATMENT PLANTS

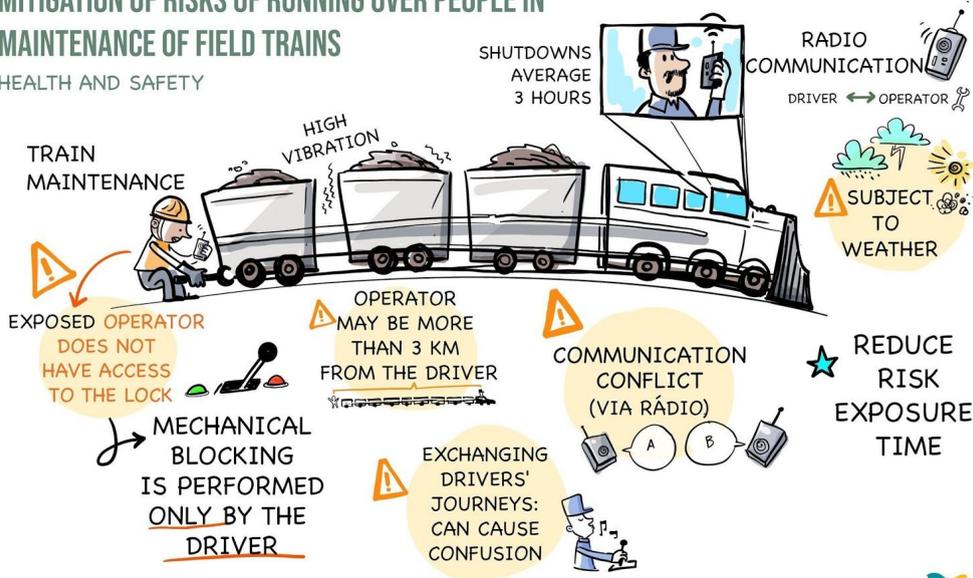
HEALTH AND SAFETY



3.3 MITIGATION OF RISKS OF RUNNING OVER PEOPLE IN MAINTENANCE OF FIELD TRAINS

MITIGATION OF RISKS OF RUNNING OVER PEOPLE IN MAINTENANCE OF FIELD TRAINS

HEALTH AND SAFETY



4 ASSET MANAGEMENT - MINE

4.1 SIZING AND PRODUCTIVITY OF STAFF ALIGNED WITH THE BEST STRATEGY

SIZING AND PRODUCTIVITY OF STAFF ALIGNED WITH THE BEST STRATEGY

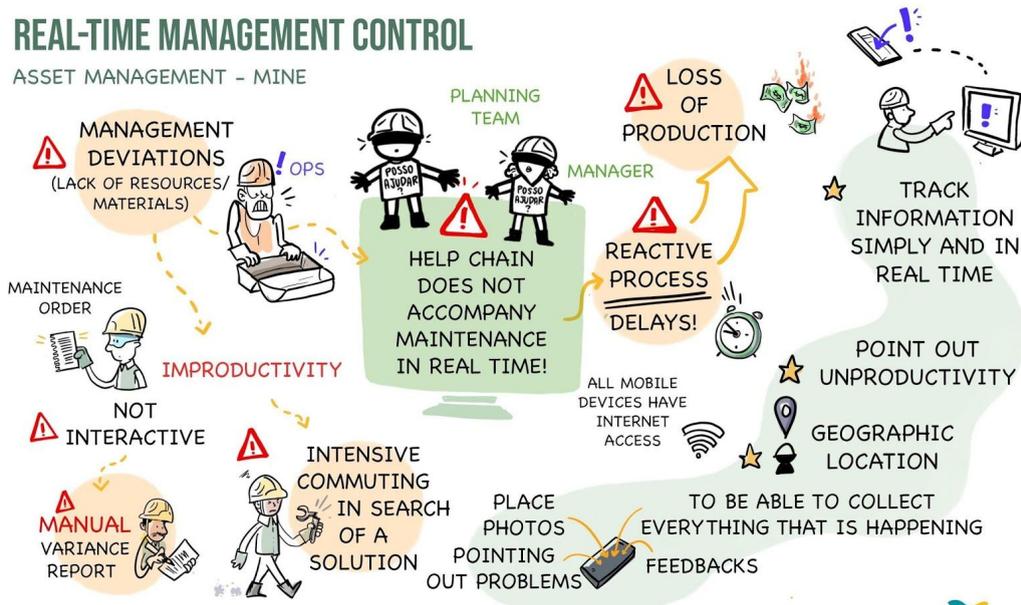
ASSET MANAGEMENT - MINE



4.2 REAL TIME MANAGEMENT CONTROL

REAL-TIME MANAGEMENT CONTROL

ASSET MANAGEMENT - MINE



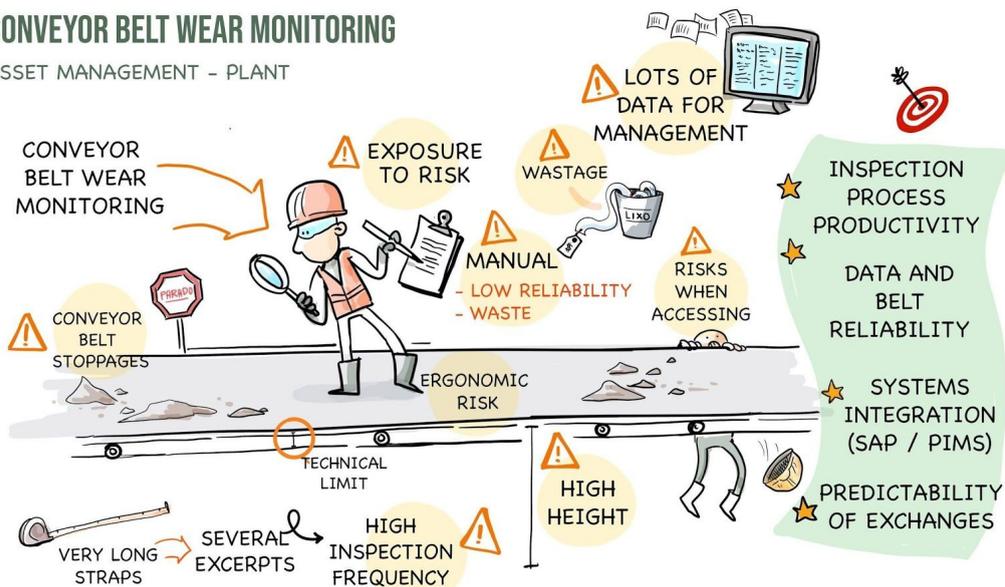
mininghub. VALE

5 ASSET MANAGEMENT - PLANT

5.1 CONVEYOR BELT WEAR MONITORING

CONVEYOR BELT WEAR MONITORING

ASSET MANAGEMENT - PLANT



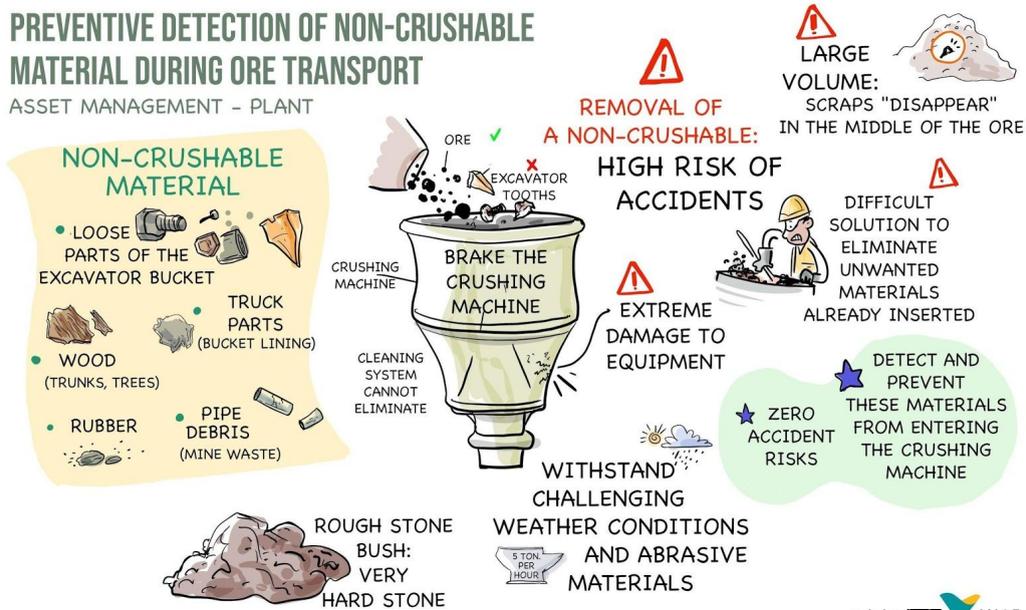
mininghub. VALE



5.2 PREVENTIVE DETECTION OF NON-CRUSHABLE MATERIAL DURING ORE TRANSPORT

PREVENTIVE DETECTION OF NON-CRUSHABLE MATERIAL DURING ORE TRANSPORT

ASSET MANAGEMENT - PLANT

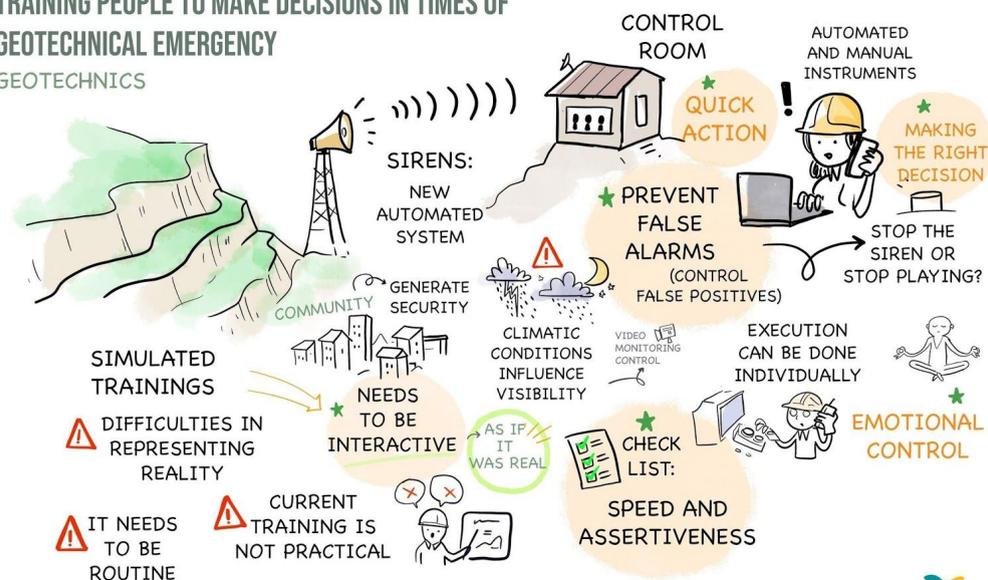


6 GEOTECHNICS

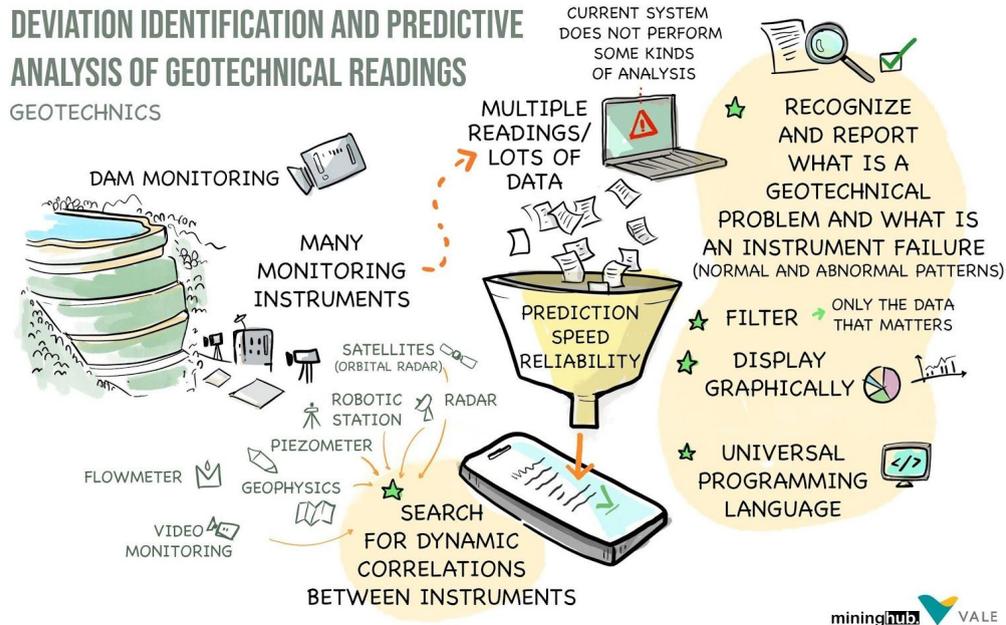
6.1 TRAINING PEOPLE TO MAKE DECISIONS IN TIMES OF GEOTECHNICAL EMERGENCY

TRAINING PEOPLE TO MAKE DECISIONS IN TIMES OF GEOTECHNICAL EMERGENCY

GEOTECHNICS



6.2 DEVIATION IDENTIFICATION AND PREDICTIVE ANALYSIS OF GEOTECHNICAL READINGS



6.3 INTEGRATED DATA MANAGEMENT AND CONTROL FOR FILTERED WASTE PILES

