

'ELIMINATION OF VRM OIL SEAL LEAKAGE USING QUALITY CIRCLE'

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ABSTRACT: The purpose of this project is to determine the matter vertical roller mill oil seal breakdown time elimination in Jindal steel works trade (pellet plant). The study is extremely necessary because the direct impact of this downside was on the productivity of the plant. This additionally causes a rise within the work of the VRM system. Additionally numerous techniques wherever employed in order to search out the foundation cause like PDCA cycle and additionally fish bone diagram was employed in order to search out the foundation reason behind the method within the oil seal. The subsequent knowledge has been recorded and it's seen that there's increase within the failure in oil seal and also the potency decreases. So, taking this into thought there ought to be necessary action to be taken. The most aim of the project is to reinforce the lifetime of oil seal insulant thanks to continual wear out of insulant by repetitive pressure of the oil.

The main impact is to eliminate the outflow of insulant considering price issue. The goal is to extend lifetime of oil seal insulant from two months to twelve months.

This study shows the changes worn out the look of the oil seal on the idea of price which ends within the low failure of the oil seal. Attributable to the low failure of the oil seal, there's increase within the lifetime of the oil seal. The most aim is to extend the productivity of the plant.

1. INTRODUCTION

1.1 Introduction to JSW Steel

JSW Dolvi Works is India's initial to adopt a mixture of Conarc Technology for each steel-making and compact strip production (CSP), aiding the assembly of hot rolled coils. From automotive and industrial to durable goods, Dolvi manufactures product that meet the wants of firms across sectors. The five MTPA integrated manufacturing plant at Dolvi is advantageously settled on the geographic area of geographical area. It's connected to a barrier which might handle merchandise of up to fifteen MTPA. Conveyer belt used has been factory-made by METSO Company. Metso provides world leading product

and services designed on technological excellence, expertise and high safety standards. Company is supported by a world network of over 15000 professionals in additional than fifty countries. Pulley-block used has been factory-made by UTTAM GALVA STEELS LTD Company. Uttam Galva Steels Ltd is one in every of the biggest makers cold rolled steel (CR) and galvanized steel (GP) in Western Asian country. The corporate procures hot rolled steel and processes it into metal and more into physician and colour-coated coils. Uttam Galva cluster additionally runs 2 additional plants in India:-Uttam Galva Metallic's restricted and Uttam price Steels restricted.

Process technology

There are four stages concerned within the production of ore pellets. These stages encompass (i) staple preparation, (ii) formation of inexperienced balls or pellets, (iii) indurations of the pellets, and (iv) Cooling, storage and transport of pellets.

Raw material preparation

During the method for pelletization ore concentrate from ore mineral dressing plant is dried and heated to around one hundred twenty deg C. The dried material is fed to the ball mill for grinding. Concentrate/ground ore of typical size eighty kind of than forty five microns (0.045 mm) with a wet content of around nine which there's needed for the pellet production. Appropriate binder (normally betonies) is adscititious to the concentrate that is completely mixed in high intensity mixer.

Formation of inexperienced balls or pellets

Green pellets with a size vary of eight metric linear unit to sixteen metric linear unit are ready in an exceedingly balling drum or in an exceedingly disc pelletizer. Disc pelletizer is most well-liked for the assembly of the standard inexperienced pellets since within the disc pelletizer it's simple to regulate the operation with minimum of foot house. The disc pelletizer is associate inclined pan having around five metres (m) to seven metres diameter. It rotates at around six rates (rotations per minute) to eight rates. The inclination of disc is

around forty five degrees and it is often adjusted within the off-line position between forty five degrees to forty nine degrees. The pre wetted combine is fed into the disc at a controlled rate. Within the disc, the fabric is coagulated and thanks to the continual movement gets fashioned into nodules/ pellets. Ore fines are upraised upwards till the friction is overcome by gravity and also the material rolls all the way down to the lowest of the disc. This rolling action initial forms little granules known as seeds. Growth happens within the sequent revolutions of the disc by the addition of additional recent feeds and by collision between little pellets. Because the pellets grow in size, they migrate to the fringe and to the highest of the bed within the discs, till they overflow the rim. Pellet growth is controlled by the tiny quantity of water sprayed within the disc and also the adjustment within the disc motion speed. These pellets are known as inexperienced pellets as they are doing not have the specified strength. The inexperienced pellets are then screened in an exceedingly roller screen and also the needed size material is fed to the move grate of a pelletizing machine.

The pre wetted combine is fed into the disc at a controlled rate. Within the disc, the fabric is coagulated and thanks to the continual movement gets fashioned into nodules/ pellets. Physical phenomenon of water, capillarity of water, and also the attractive force within the balling disc are the forces that act on the ore particles. Hence, they get coalesce along and type nuclei that grow in size and into ball form. These forces to blame for the agglomeration of ore fines are generated within the balling disc due the motion movement within the balling disc. Once the solid particles are available contact with water, the ore surface is wetted and coated with water film. Attributable to the physical phenomenon of the water film, liquid bridges are fashioned. As a result the initial agglomeration of the particles causes formation of seeds. The initial agglomeration of the particles causes formation of seeds. The liquid bridges within the interior of those seeds hold the particles along as if the particles area unit during a network. The optimum of this ball formation section is attended once all the ports within the balls area unit stuffed with liquid. Once the solid particles area unit absolutely coated with water, the physical phenomenon of water droplets becomes absolutely active dominating the capillary forces. Besides this impact, the rolling movement of grains and movement or shifting of particles relative to every alternative conjointly plays a very important role for iron ore starts at around 1100 degree C.

Induration

During the indurations, heat hardening of inexperienced pellets is disbursed. Indurations of inexperienced pellets consists of 3 main steps specifically (i) drying of inexperienced pellets, (ii) firing of pellets at around 1300

deg C to mould the iron compound particles, and (iii) cooling of hot pellets before discharging.

During drying (temperature vary of one hundred eighty deg C to 350 deg C), wet content of the inexperienced pellet is gaseous. Surface and opening wet evaporates at lower temperatures whereas with chemicals combined water (as goethite or limonite) or any hydrate or hydroxide combos lose their water at slightly higher temperature. Throughout pre-heating stage (temperature vary of five hundred deg C to one, 100 deg C), decomposition of carbonates and hydrates takes place. Chemical change of solid fuels like coal or coke and conversion of iron oxides like goethite, siderite, and iron ore to higher compound state iron ore, conjointly takes place throughout this stage. Commencement of solid compound bonding and grain growth area unit the vital steps of this stage. Throughout firing stage (temperature vary of 1250 degree C to 1340 degree C), the temperature is below the melting temperature of major compound section however among the reactivity vary of gangue parts and additives. Formation of oxides and scum bonds is decisive of this stage.

Bonding of mineral grains developed throughout indurations of pellets is full of the 3 factors consisting of (i) solid compound bonding, (ii) re-crystallization of iron compound, and (iii) scum bonding. Solid compound bonding is because of the reaction of metal iron oxides to ferrous iron oxides which ends up in bonding and bridging, however solely by a restricted quantity. Re-crystallization of iron oxides is basically a physical method within which smaller particles consolidate into larger ones with the loss of surface energy. Throughout the re-crystallization of iron oxides, continuing growth of iron compound crystals imparts enough strength.

The indurations treatment causes sure chemical reactions to occur that modification the particular science properties of the pellets. These reactions will embrace the reaction of iron ore and dehydration of earthy iron ore. For BF grade, fluxed pellets area unit created with additions of rock, dolomite, silica, etc. to the balling feed.

Pellet cooling and handling

The pellets area unit cooled and screened once the indurations. The outsized pellets area unit crushed and area unit sent the small to the stock house bins wherever they're reprocessed. Cooled pellets area unit sent to the storage for his or her transport to the downstream plants for additional process.

1.2 Introduction to Pellet plant

Pelletizing may be a method that involves combining of terribly finely ground particles of ore fines having a size that is a smaller amount than two hundred mesh (0.074 millimetre) with additives like clay so shaping them into

close to oval/spherical balls having size within the vary of eight millimetre to sixteen mm in diameter by a pelletizer and hardening the balls by firing with a fuel. It's AN agglomerating method of changing ore fines into 'uniformed sized ore pellets' which may be charged directly into a chamber furnace} (BF) or into a vertical furnace or rotary oven usually used for the assembly of direct reduced iron (DRI).

LITERATURE REVIEW

Pelletizing is AN agglomeration method that converts terribly fine grained ore into balls of an explicit diameter vary (normally 8mm to twenty millimetres, conjointly called pellets. These pellets area unit appropriate for furnace and direct reduction processes. Pelletizing differs from sintering in this a inexperienced unbaked pellet or ball is created so hardened by heating. Ore pellets may be made up of beneficiated or run of mine ore fines. Lean ores area unit usually upgraded to the next iron ore content through ore dressing. This method generates ore filter cake that has to be pelletized in order that it may be utilized in AN iron creating method. Conjointly throughout the process of high grade iron ores that don't would like ore dressing, generated fines may be pelletized and used rather than being disposed of. Pellet plants may be settled at mines, close to ports or may be connected to steel plants. Equipped with advanced environmental technology, they're just about pollution free, generating no solid or liquid residues.

History of pelletization

The history of pellets began in 1912 once A.G. Andersson, a Swede, made-up a pelletizing methodology. The business use of pellets, however, began within the USA once warfare. Numerous studies were conducted in USA with the aim of developing the Brobdingnagian reserves of iron ore (a low grade iron ore) within the space round the lake. The method of enriching iron ore ore concerned grinding the ore to get rid of gangues and upgrading the ore (i.e., AN ore dressing process). The resultant high grade ore is within the variety of fine particles, as little as zero.1 millimetre or less, that isn't appropriate for sintering.

In 1943, Dr. Davis, a academic at the University of North Star State, Mines Experiment Station, and his associates fabricated a way for process chart containing low grade ore. Their invention showed that it absolutely was potential to ball or pelletize fine magnetic iron-ore concentrate in a very balling drum which if the balls were discharged at sufficiently extreme temperature (usually below the purpose of inchoate fusion) a tough, indurated pellet well tailored to be used within the furnace, may well be created. Consequently, despite the unquestionable edges of form on furnace (BF) performance, intense interest within the pelletizing method had developed owing to the outstanding performance achieved by steel plants in extended

operations with pellets because the principal iron bearing material within the furnace burden.

Quality of the pellets is influenced by the character of the ore or concentrate, associated gangue, sort and quantity of fluxes side. These factors successively end in the variation of chemical science properties of the synchronal phases and their distribution throughout the pellet indurations. Hence properties of the pellets area unit for the most part ruled by the shape and degree of bonding achieved between the ore particles and also the stability of those bonding phases throughout reduction of iron oxides. Since the formation of phases and microstructure throughout indurations depends on the sort and quantity of fluxes side, there's a bearing of fluxing agents in terms of CaO/SiO₂ magnitude relation and MgO content on the pellet quality.

The strength of ore pellets is vital in minimizing degradation by breakage and abrasion throughout handling and shipping, and within the furnace. robust bonding in pellets is believed to result to grain growth from the attendant reaction of magnetic iron-ore to haematite, or re-crystallization of haematite. Though scoria bonding could promote additional speedy strengthening at slightly lower firing temperatures, pellet strength is generally diminished, particularly resistance to thermal shock. Pellet strength is most ordinarily determined by compression and tumble tests. Compressive strengths of individual pellets depend on the mineralogical composition and physical properties of the concentrate, the additives used, the balling technique, pellet size, firing technique and temperature, and testing procedure. The compressive strengths of commercially acceptable pellets area unit typically within the vary of two hundred to 350 kilo for pellets within the size vary of nine millimetre to eighteen millimetre. Within the tumbler check eleven.4 kilo of +6 millimetre pellets area unit tumbled for two hundred revolutions at twenty five rates in a very drum tumbler (ASTM E279-65T) then screened. A satisfactory business pellet ought to contain no quite regarding five you look after minus zero.6 millimetre (minus twenty eight meshes) fines, and ninety four nothing or additional of and half-dozen millimetre size, once tumbler testing. A minimum of broken pellets between half-dozen millimetre and zero.6 millimetre in size is additionally fascinating. Alternative vital properties of the pellets to be used for furnace feed area unit reducibility, porosity, and bulk density. With some concentrates these are often varied at intervals sure limits.

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CONCLUSION

The Root cause analysis is finished which ends into excessive pressure. on top of the 2 solutions, one among {the technique. The tactic the strategy} is chosen that is predicated on cost!! From this method, we've got determined that the lifetime of oil seal has inflated from two months to twelve months. The advantage of the answer is that the failure of oil seal decrease from four per month to zero failure per month. Therefore the lifetime of oil seal is inflated and also the maintenance cost of seal is decrease. Owing to this, the productivity of the plant is inflated.

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