ABSTRACT

This report describes overall process of cement production from exploration of limestone deposit to production of clinker and finally cement. Exploration of limestone comprises area selection, target definition, reserve calculation, resource evaluation and reserve definition. After exploration, mining is taken up. Quarried limestone is stockpiled and then is blended with other raw material like clay/shale, silica, and iron ore in required proportion. The blended material is then heated at high temperature up to 1400–1450 degree Celsius in a kiln to produce clinker. The clinker is grinned along with 3–5% gypsum to produce cement. The main aim of the field trip was to understand the real application of instrumentation system, and to find whether there are any problems in the existing system and propose a design to solve the problem in more applicable manner. The technologies used in the cement factory were observed. We found the major problems in Kepy cement factory were pollution, labor insecurity, lack of space for the storage of cement, and no automated system in temperature control, improper management, and no backup if one of the systems fails (especially the motors). Some of the changes that can be made are automation in temperature control, a method for minimizing pollution is discussed in this report.

PREFACE

As a part of the engineering curriculum and in order to gain practical of knowledge in the field of Engineering and its applications, we are required to make this case study report on “Kepy Cement Industries Pvt. Ltd”. The basic objective behind doing this report is to gain knowledge of existing technology, methods, current situation and associated challenges in cement industry. Doing this report helped us to enhance our knowledge regarding the process of cement production and we found that it is better and efficient to produce cement in Nepal as our country is rich in limestone and other raw materials required for the production of cement. But we found that the technology used is somehow outdated and more scientific, recent and advance technologies could be used so that the cost of the production also reduces as well as we get a good quality product (cement).

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ACKNOWLEDGEMENT

The field programs provide an opportunity to apply previous knowledge, view real examples set in a worldly framework, and opportunity to be involved, physically, with real situations in the field. All of this promotes a deeper understanding of the subject being studied and an improved ability to recall the information and experiences, later, as needed.

It is understood that personal experiences gained by working with "real" world activities and in "real" settings enhance and improve learning, increasing understanding and knowledge. Since activities in the field are never limited to one discipline or aspect, they will always broaden awareness and emphasize connections between ideas and practical realities. Practical experiences are invaluable and the fact that Kathford International College of Engineering and Management has always been an outstanding educational leader in higher education is largely due to its long standing commitment to providing real, hands-on, learning opportunities for its students.

We would like to express our gratitude to the Department of Electronics & Communication and Computer Engineering to provide the opportunity to go the field and observe the practicality of Electronic/Electrical instruments and uses of different types of Software in the industry.

Also we would like to thank Er. Saban Kumar K.C. and Mr. Santosh Thapa for guiding and co-operating us in various obstacles of ours with attention and care. Also we would like to thank them for providing the directions without which preparation of this report would have been a nightmare.

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HISTORY

All through history, solidifying materials have assumed a key part. They were utilized generally as a part of the old world. The Egyptians utilized calcined gypsum as bond. The Greeks and Romans utilized Lime made by warming limestone and added sand to make mortar, with coarser stones for Concrete.

The Romans found that concrete could be made which set submerged and this was utilized for the development of harbors. The bond was made by adding squashed volcanic fiery debris to lime and was later called "pozzolanic" concrete, named after the town of Pozzuoli close Vesuvius.

In spots, for instance, Britain, where volcanic searing remains was uncommon, squashed square or tile was used. The Romans were therefore the first to control the properties of cementitious materials for specific applications and circumstances

The colossal medieval houses of prayer, for example, Durham, Lincoln and Rochester in England and Chartres and Rheims in France, were unmistakably worked by exceedingly talented bricklayers. In spite of this, it would likely be reasonable to say they didn't have the innovation to control the properties of cementitious materials in the way the Romans had done a thousand years before.

The Renaissance and Age of Enlightenment brought better approaches for considering, which regardless, prompted the mechanical revolution. In eighteenth century Britain, the hobbies of industry and Empire harmonized, with the need to manufacture beacons on presented rocks to avert shipping misfortunes. The steady loss of vendor boats and warships drove concretes innovation advances.

Smeaton, building the third Eddy stone beacon (1759) off the bank of Cornwall in Southwestern England, found that a blend of lime, dirt and pulverized slag from iron-production created a mortar which solidified submerged. Joseph Aspdin took out a patent in 1824 for "Portland Cement," a material he delivered by terminating finely-ground mud and limestone until the limestone was calcined. He called it Portland bond in light of the

fact that the solid produced using it looked like Portland stone, a generally utilized building stone as a part of England.

While Aspdin is generally viewed as the innovator of Portland concrete, Aspdin's bond was not created at a sufficiently high temperature to be the genuine harbinger of cutting edge Portland bond .Nevertheless, his was a noteworthy advancement and resulting advancement could be seen as insignificant improvement.

A couple of years after the fact, in 1845, Isaac Johnson made the primary present day Portland concrete by terminating a blend of chalk and dirt at much higher temperatures, like those utilized today. At these temperatures (1400C-1500C), clinkering happens and minerals structure which are extremely responsive and all the more firmly cementations.

1. Introduction:

Concrete has been classified as the major valuable material. In the present day society, concrete is a standout amongst the most dependable and critical productive material. Since it has been utilized generally so it is important to have the brief information about it

What is cement?

Concrete alludes to material which goes about as a coupling substance. In development What's more, thoughtful designing, concrete is utilized to tie basic individuals for development of structures, asphalts, passages, streets and parkways and so forth.

Cement may be Natural cement or Artificial cement:

Natural cement is manufactured by burning and then crushing the natural cement stones. Natural cement stones are such stones which contain 20% to 40% of argillaceous matter i.e. clay and remaining content mainly calcareous matter which is either calcium carbonate alone or mixture of calcium carbonate and magnesium carbonate. Artificial cement is manufactured by burning at high temperature an intimate mixture of argillaceous and calcareous substances. The burnt mixture of calcareous and argillaceous matter is known as clinker. And at last the resulting clinkers are crushed to a fine powder in which a little gypsum is added. Gypsum is added to delay the setting action of the cement for some time, so that , it may be properly mixed , applied and finished.

Generally cement used in the construction works, are of following types:

1. Ordinary Portland Cement (OPC)
2. Blast Furnace Slag Cement (BFSC)
3. Portland Pozzolona Cement (PPC)
4. Rapid Hardening Cement (RHC)
5. Sulphate Resistant Cement (SRC)

The OPC or the Ordinary Portland Cement is the main sort of bond being delivered in Nepal.

This is most ordinarily being utilized as a part of basic development such as building house and so forth. Standard Portland Cement is the most widely recognized sort of concrete all in all utilization around the globe since it is an essential element of solid, mortar, stucco and most non-forte grout. It is a fine powder created by pounding Portland bond clinker (more than 90%), a constrained measure of calcium sulfate (which controls the set time) and up to 5% minor constituents (as permitted by different guidelines).

Some Cement Industries of Nepal

S.no	Names Of Industry	Address/Location	Contact No.
1	Hetauda Cement Industries Ltd.	Lamshure, Hetauda	520385
2	Udayapur Cement Industries Ltd.	Jaliale, Udayapur	420280
3	Shree Maruti Cement Ltd.	Mirchaiyaa	
4	J.K White Cement Works	Head off:Kuleshwor, Ktm	9851030852
5	Cosmos Cement Industries Pvt. Ltd.	Dhanusha, Janakpur	522397
6	Buddha Cement Pvt. Ltd.	Head off:Tripureshwor, Ktm	4259953
7	Jay Manglam Cement(P) Ltd.	Head off:Thapathali,	4260910
8	Grasim Industries Ltd.	Head off:Kathmandu	9851036733
9	National Cement Pvt. Ltd.	Head off: Tripureshwor,Ktm	4260878
10	Dynasty Industries Nepal Pvt. Ltd.	Head off:Ravibhawan,Ktm	4282473
11	Triveni Group	Adarsha Nagar, Birgunj	522224
12	Chachan Impex	Mahabir road, Birgunj	522268
13	KC super Cement	Head off:Ktm	4476539

1.1 Composition of Cement

The standard concrete comprises of three fixing transcendently. They are dirt or alumina, silica also, lime. Moreover, these fixing most concrete contain little amountof iron oxide, magnesium oxide, sulfur trioxide, alkalies and different materials. The run of the mill rate of these constituents in great customary bond might be as per the following.

Name of constituent	**Typical percentage**	**Limit of %**
1. Almunia or clay (Al2O3)	5%	3-8%
2. Silica(SiO2)	22%	17-25%
3. Lime(CaO)	62%	60-67%
4. Iron oxide	3%	0.5-6%
5. Magnesia (MgO)	2%	0.1-4%
7. Sulphur trioxide	1%	1-3%
8. Alkalies (Soda and potash)	1%	0.2-1%
9. Calcium sulphate (CaSO4)	4%	3-5%

1.2 Functions

Functions of each ingredient of cement are briefly given as follows:

1. **Alumina or dirt**:

   Alumina is in charge of setting activity of bond. Bigger the measure of alumina present in bond, speedier it will begin setting. Abundance amount of alumina debilitates the bond. Alumina frames complex aluminates with silica and calcium and confers the setting property to the concrete.

2. **Silica (SiO2):**

   It likewise runs into chemical combination with calcium and structures hard silicates which are in charge of granting quality to the concrete.

3. **Lime (CaO):**

   It is the most imperative element of bond and its mass in concrete is above 60% of the aggregate substance. Its extent shoul be deliberately chosen. On the off chance that lime is included pointlessly in overabundance amount, some piece of it, cleared out in types of free lime which causes development and breaking down of concrete at the season of setting and solidifying. Lesser than the required amount will bring about diminishing in the quality of the concrete, as at that point adequate calcium silicates won't be framed, which are for the most part in charge of the quality attributes of the concrete.

4. **Iron Oxide:**

   This fixing for the most part gives shading to the concrete. Other than this, it additionally goes into substance mix and expands quality and hardness of the concrete.

5. **Magnesium Oxide(MgO):**

   It additionally gives quality and hardness to the concrete, yet as it were at the point when present in little sum.

6. **Sulfur Trioxide:**

   Small rate of sulfur renders bond sound. Abundance sum of it might make it, unsound.

7. **Alkalis**:

   Alkalis, present in the crude materials utilized for the assembling of bond are Generally determined out by the vent gasses amid smoldering. Still it might be available in the bond, in any case, just in little sum. Abundance of alkalis, cause flowering in the bond and along these lines go about as pollution.

8. **Calcium Sulphate(CaSO4) or Gypsum:**

   This fixing is utilized to impede or drag out the starting setting activity of the bond.

2. Objective of the Study:

The main objectives of this study are as follows:

- To think about the general production procedure of concrete.
- To think about various crude materials required and structure of concrete.
- To think about different sources and sorts of toxins on concrete commercial ventures and contamination control measures utilized.
- To think about various quality control strategies utilized as a part of concrete commercial ventures.
- To think about status of bond businesses of Nepal.

3. Operation of Existing system

3.1. Crushing:

Firstly the line real segment in the synthesis of concrete Calcium Oxide (CaO) is acquired from the quarries is pulverized to seven inch amid essential smashing and 25mm amid auxiliary pulverizing. All the smashed materials are checked for calcium carbonate, lime, alumina, ferrous oxide and silica contains. This procedure is done over and again as there might be a few varieties in organization of limestone got from same quarries. In the event that the synthesis of limestone does not meet the required or the fancied quality then a few limestone having great synthesis is blended. This can be seen in Hetauda Cement Industry where the real wellspring of limestone is Okhare however a low quality has yet the quality is still kept up by great limestone got from Jogimara quarries.

3.2. Raw Mill:

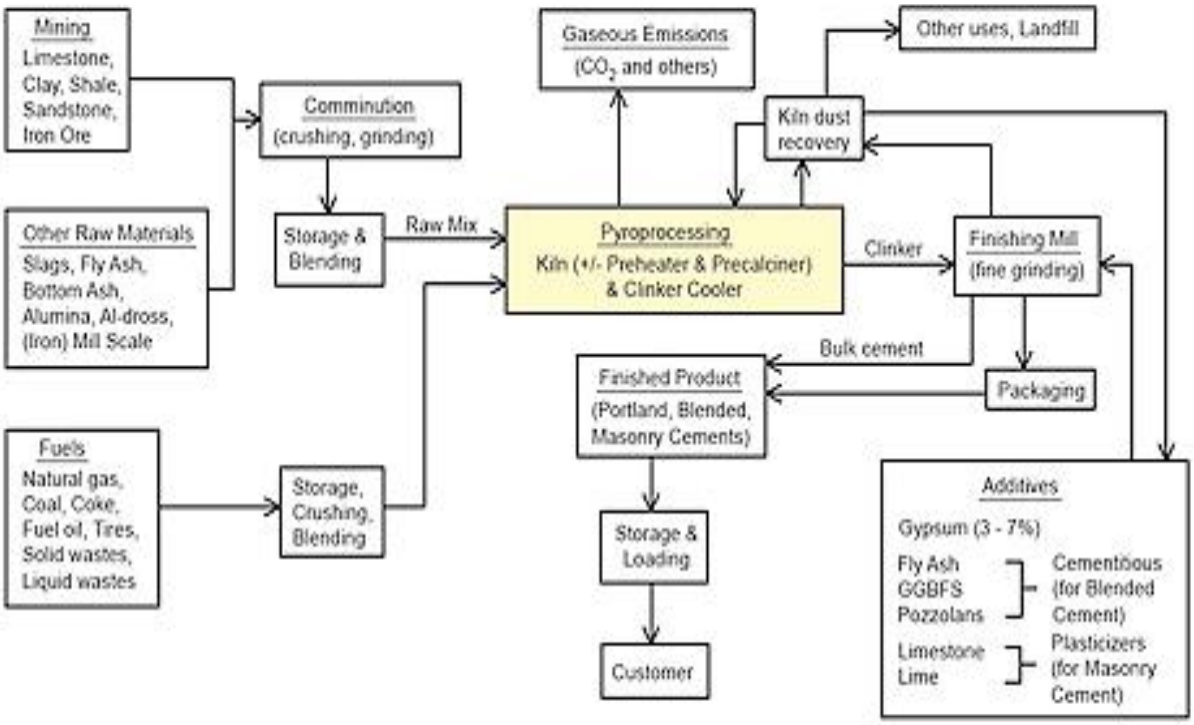

Figure 1: Layout of Cement Production System

The crude plant is the hardware used to granulate crude material into crude blend amid the assembling of the bond. The crude factory stays of the procedure successfully characterizes the science of the completed bond and has the extensive impact upon the proficiency of the entirety producing process. The crude minerals are sustained to crude factories by the method for transport and proportioned with the assistance of weight feeder which are balanced according to synthetic examination done on the crude materials. The crude materials are ground to the coveted finest in the crude plant. The subsequent fine powder is blown upward where it is gathered in violent winds. The fine powder is nourished to the substantial size keeps mixing and capacity by utilization of air post. The mineral from the mixing storehouse is dropped by gravity.

3.3. Clinkerisation:

Material is expanded in stages from 60C to 850C with the assistance of hot gasses having the temperature of 1000C. The pre radiator is an inclined oven in which proportional crude material is bolstered from top. There being slop the material naturally comes at the lower end of the pre radiator. The crude blend is warmed in a concrete oven, a gradually pivoting and slanted barrel, with temperatures expanding over the length of the chamber up to a crest temperature of 1400-1450 °C. A mind boggling progression of synthetic responses occur (see bond oven) as the temperature rises. The crest temperature is directed so that the item contains sintered however not melded knots. Sintering comprises of the softening of 25- 30% of the mass of the material. The subsequent fluid draws the staying strong particles together by surface strain, and goes about as a dissolvable for the last synthetic response in which alite is shaped. Alite is the name for Tri calcium Silicate Ca3SiO5.. It is the qualities mineral in the Portland bond. Too low a temperature causes deficient sintering and deficient response, however too high a temperature results in a liquid mass or glass, decimation of the furnace coating, and misuse of fuel. At the point when all goes to arrange, the subsequent material is clinker.

3.4. Grinding

With a specific end goal to accomplish the coveted setting qualities in the completed item, an amount (2-8%, be that as it may, ordinarily 5%) of calcium sulfate (normally gypsum or anhydrite) is added to the clinker what's more, the blend is finely ground to frame the completed concrete powder. This is accomplished in a bond factory.

The crushing procedure is controlled to get a powder with a wide molecule size reach, in which regularly 15% by mass comprises of particles underneath 5 μm breadth, furthermore, 5% of particles above 45 μm. The measure of fineness normally utilized is the "particular surface", which is the aggregate molecule surface range of a unit mass of concrete. The rate of introductory response (up to 24 hours) of the concrete on expansion of water is straightforwardly corresponding to the particular surface. Ordinary qualities are 320–380 m2·kg−1 for universally useful bonds, furthermore, 450–650 m2·kg−1 for "quick solidifying" bonds. The concrete is passed on by belt or powder pump to a storehouse for capacity. Bond plants typically have adequate storehouse space for 1–20 weeks creation, contingent on nearby request cycles. The bond is conveyed to end-clients either in sacks or as mass powder blown from a weight vehicle into the client's storehouse. In created nations, 80% or a greater amount of concrete is conveyed in mass, and numerous concrete plants have no sack pressing office. In poor nations sacks are the typical method of conveyance.

3.5. Packing of cement

Bond are for the most part gathered in jute sacks traditionally and this is additionally utilized as a part of pressing of bond in Nepal due to its minimal effort. Be that as it may, jute has numerous downsides recorded beneath

- Jute packs when discharged contains some bond which is squandered and as a result of this wastage full amount does not achieve the solid blend.
- The treatment of jute packs demonstrates unsafe to the strength of worker as they breathe in a extensive measure of bond amid stacking and emptying.
- The nature of bond is influenced because of passage of dampness from the environment

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4. Major Pollutants from a Cement Factory

Emissions from cement works are determined both by continuous and discontinuous measuring methods. Continuous measurement is primarily used for dust, NOx and SO2, while the remaining parameters relevant pursuant to ambient pollution legislation are usually determined discontinuously by individual measurements. The following descriptions of emissions refer to modern kiln plants based on dry process technology.

1: Carbon dioxide

Amid the clinker smoldering procedure CO2 is discharged. CO2 represents the principle offer of these gasses. CO2 discharges are both crude material-related and vitality related. Crude material-related discharges are delivered amid limestone decarbonation (CaCO3) and record for around 60 % of complete CO2 outflows.

2: Dust

To fabricate 1 t of Portland concrete, around 1.5 to 1.7 t crude materials, 0.1 t coal and 1 t clinker (other than other concrete constituents and sulphate agents) must be ground to clean fineness amid generation. In this procedure, the progressions of crude material handling, fuel arrangement, clinker smoldering what's more, concrete crushing constitute real outflow hotspots for particulate segments. While particulate emanations of up to 3,000 mg/m3 were measured leaving the pile of concrete revolving furnace plants as of late as in the 1950s, lawful points of confinement are ordinarily 30 mg/m3 today, and much lower levels are achievable.

3: Nitrogen oxides (NOx)

The clinker smoldering procedure is a high-temperature process bringing about the arrangement of nitrogen oxides (NOx). The sum framed is straightforwardly identified with the primary fire temperature (normally 1850 – 2000 °C). Nitrogen Monoxide(NO) represents around 95 %, and nitrogen dioxide (NO2) for around 5 % of this compound present in the fumes gas of rotating oven plants. As the greater part of the NO is changed over to NO2 in the climate, outflows are given as NO2 per cubic meter fumes Gas. Without decrease measures, process-related NOx substance in the fumes gas of rotating oven plants would much of the time extensively surpass the particulars of e.g. European

enactment for waste smoldering plants (0.50 g/m3 for new plants and 0.80 g/m3 for existing plants). Decrease measures are gone for smoothing and upgrading plant operation. In fact, organized ignition and Selective Non-Catalytic NO Reduction (SNCR) are connected to adapt to as far as possible qualities. High process temperatures are required to change over the crude material blend to Portland bond clinker. Oven charge temperatures in the sintering zone of rotational furnaces range at around 1450 °C. To come to these, fire temperatures of around 2000 °C are fundamental. For reasons of clinker quality the smoldering procedure happens under oxidizing conditions, under which the halfway oxidation of the sub-atomic nitrogen in the ignition air bringing about the development of nitrogen monoxide (NO) commands. This response is additionally called warm NO arrangement. At the lower temperatures winning in a precalciner, in any case, warm NO development is irrelevant: here, the nitrogen bound in the fuel can bring about the arrangement of what is known as fuel-related NO. Arranged burning is utilized to diminish NO: calciner fuel is included with inadequate ignition air.

This causes CO to frame.

The CO then decreases the NO into sub-atomic nitrogen:

$2\ CO + 2\ NO \rightarrow 2\ CO2 + N2.$

Hot tertiary air is then added to oxidize the remaining CO.

4: Sulphur dioxide (SO2)

Sulphur is input into the clinker smoldering procedure through crude materials and powers. Contingent upon their starting point, the crude materials might contain sulphur bound as sulphide or sulphate. Higher SO2 discharges by rotating furnace frameworks in the concrete business are regularly inferable from the sulphides contained in the crude material, which get to be oxidized to frame SO2 at the temperatures between 370 °C and 420 °C winning in the furnace preheater. The greater part of the sulfides are pyrite or marcasite contained in the crude materials. Given the sulphide focuses discovered e.g. in German crude material stores, SO2 outflow fixations can add up to up to 1.2 g/m3 relying upon the site area. Now and again, infused calcium hydroxide is utilized to bring down SO2 outflows. The sulphur info with the fills is totally changed over to SO2 amid burning in the turning oven. In the preheater and the oven, this SO2 responds to shape salt sulphates, which are bound in the clinker, gave that oxidizing conditions are kept up in the oven.

5: Carbon monoxide (CO) and total carbon

The fumes gas convergences of CO and naturally bound carbon are a measuring stick for the burnout rate of the energizes used in vitality change plants, for example, power stations. By difference, the clinker smoldering procedure is a material change handle that should dependably be worked with abundance air for reasons of clinker quality. Working together with long living arrangement times in the high temperature extend, this prompts complete fuel consume. The emanations of CO and naturally bound carbon amid the clinker smoldering procedure are brought on by the little amounts of natural constituents data through the regular crude materials (remainders of life forms and plants fused in the stone over the span of geographical history). These are changed over amid oven bolster preheating and get to be oxidized to frame CO and CO2. In this procedure, little parcels of natural follow gasses (all out natural carbon) are framed also. In instance of the clinker smoldering procedure, the substance of CO and natural follow gasses in the perfect gas subsequently may not be specifically identified with ignition conditions.

6: Benzene, toluene, ethylbenzene, xylene (BTEX)

When in doubt benzene, toluene, ethylbenzene and xylene are available in the fumes gas of rotating furnaces in a trademark proportion. BTEX is shaped amid the warm deterioration of natural crude material constituents in the preheater.

7: Gaseous inorganic chlorine compounds (HCl)

Chlorides are minor extra constituents contained in the crude materials and energizes of the clinker blazing procedure. They are discharged when the energizes are copied or the furnace food is warmed, and fundamentally respond with the soluble bases from the furnace food to shape antacid chlorides. These mixes, which are at first vaporous, consolidate on the oven sustain or the furnace dust, at temperatures between 700 °C and 900 °C, along these lines re-enter the rotational oven framework and vanish once more. This cycle in the territory between the rotational oven and the preheater can bring about covering development. A detour at the oven bay permits compelling lessening of salt chloride cycles and to reduce covering develop issues. Amid the clinker smoldering procedure, vaporous inorganic chlorine mixes are either
not radiated at all or in little amounts as it were.

5. Ways of Storing Cement

The cement can be stored as follows:

1. Cement bags should not be stored in an enclosed area where the walls, roof and floor is not completely weatherproof.
2. Cement bags must not be stored in wet surroundings and humid conditions.
3. Stack cement bags on wooden planks or concrete floor and do not stack them against the wall.
4. Cement bags should be piled close together.
5. It is better to arrange the cement bags in a header and stretcher fashion.
6. Cement bags that were stored first must be used first.

6. Pollution control

Portland concrete assembling can bring about natural effects at all phases of the procedure. These incorporate outflows of airborne contamination as dust, gasses, commotion and vibration when working hardware and amid impacting in quarries, utilization of huge amounts of fuel amid assembling, arrival of CO2 from the crude materials amid production, and harm to wide open from quarrying. Gear to lessen dust emanations amid quarrying and assembling of bond is broadly utilized, and hardware to trap and separate fumes gasses are coming into expanded use. Ecological insurance additionally incorporates the re-reconciliation of quarries into the wide open after they have been shut around returning them to nature or recultivating them. There are mostly 2 types of gear utilized for air contamination control as a part of Nepal. The contamination controlling gadget like RABH (Reverse air sack house) and ESP(Electrosttic Precipatator) both are introduced in the Maruti concrete industry ltd.whereas ESP is just introduced in Hetauda concrete industry Ltd.

1: ESP (Electrostatic precipitator):

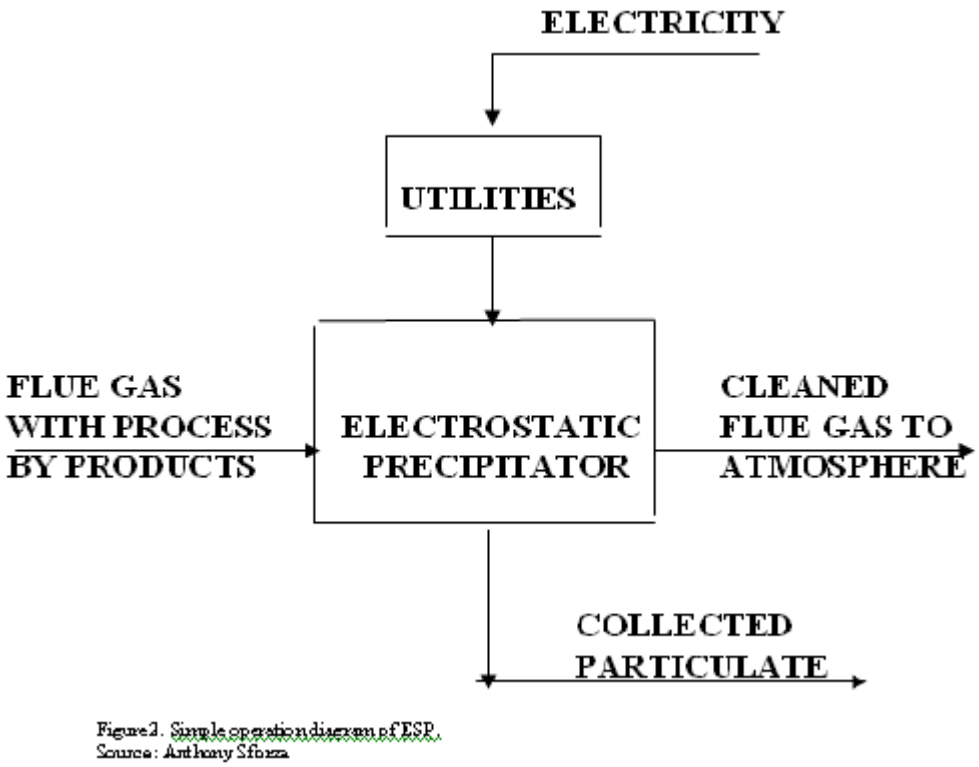

Figure 2: Electrostatic Precipitator

Electrostatic precipitators use electrostatic strengths to particular dust particles from fumes gasses. A number of high-voltage, direct-current release terminals are set between grounded gathering cathodes. The defiled gasses course through the section framed by the release what's more, gathering cathodes. Electrostatic precipitators work on the same guideline as home "Ionic" air purifiers. The airborne particles get a negative charge as they go through the ionized field between the cathodes. These charged particles are then pulled in to a grounded or emphatically charged anode and stick to it. The gathered material on the anodes is evacuated by rapping or vibrating the gathering cathodes either constantly or at a foreordained interim. Cleaning a precipitator should normally be possible without interfering with the wind stream

2: RABH (Reverse Air Bag House):

Backward air pack houses, the sacks are secured onto a cell plate at the base of the sack house and suspended from a flexible holder outline at the top. Messy gas stream regularly enters the pack house and goes through the sack from within, and the dust gathers on the

within the packs. Reverse-air pack houses are compartmentalized to permit persistent operation. Before a cleaning cycle starts, filtration is ceased in the compartment to be cleaned. Packs are cleaned by infusing clean air into the dust authority in an opposite heading, which pressurizes the compartment. The weight makes the packs crumple incompletely, making the dust cake split and fall into the container beneath. Toward the end of the cleaning cycle, reverse wind stream is suspended, and the compartment is come back to the standard. The stream of the messy gas keeps up the state of the pack. Be that as it may, to anticipate all out breakdown and fabric scraping amid the cleaning cycle, inflexible rings are sewn into the packs at interims. Space necessities for a converse air pack house are practically identical to those of a shaker sack house; be that as it may, upkeep needs are fairly more noteworthy up on a raised platform and covered with a sheet.

7. Intelligent Pollution Monitoring Using Wireless Sensor Networks

Different types of sensors are used to implement this idea. The signals acquired from the sensors are processed in the controller and proper control measures are taken. GSM, which is used to transmit the message from a controller to the mobile possess three basic structures like base station subsystem, networking and switching subsystem and the GPS core network. A pH meter which is used to check the alkalinity of consists of a special measuring probe which is a glass electrode connected to an electronic meter that measures and displays the pH reading. A gas detector that detects the existence of various gases whose standard is above the level specified by the controller. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically shut down. A gas detector identifies any leak occurrence and produces an alarm thus giving the human beings an opportunity to leave the area. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals. Gas detectors are usually battery operated. They transmit warnings via a series of audible and visible signals such as alarms and flashing lights, when dangerous levels of gas vapours are detected. As detectors measure a gas concentration, the sensor responds to a calibration gas, which serves as the reference point or scale. As a sensor's detection exceeds a pre-set alarm level, the alarm or signal will be activated. As units, gas detectors are produced as portable or stationary devices. Originally, detectors were produced to detect a single gas, but modern units may detect several toxic or combustible gases, or even a combination of both types. In this system model, the gas sensor is used to monitor Carbon di-oxide presence and volume in the industrial outlet. Similarly the liquid effluents are monitored using the pH meter. The memory of the system is used as per DAQ and processing requirements of the system.

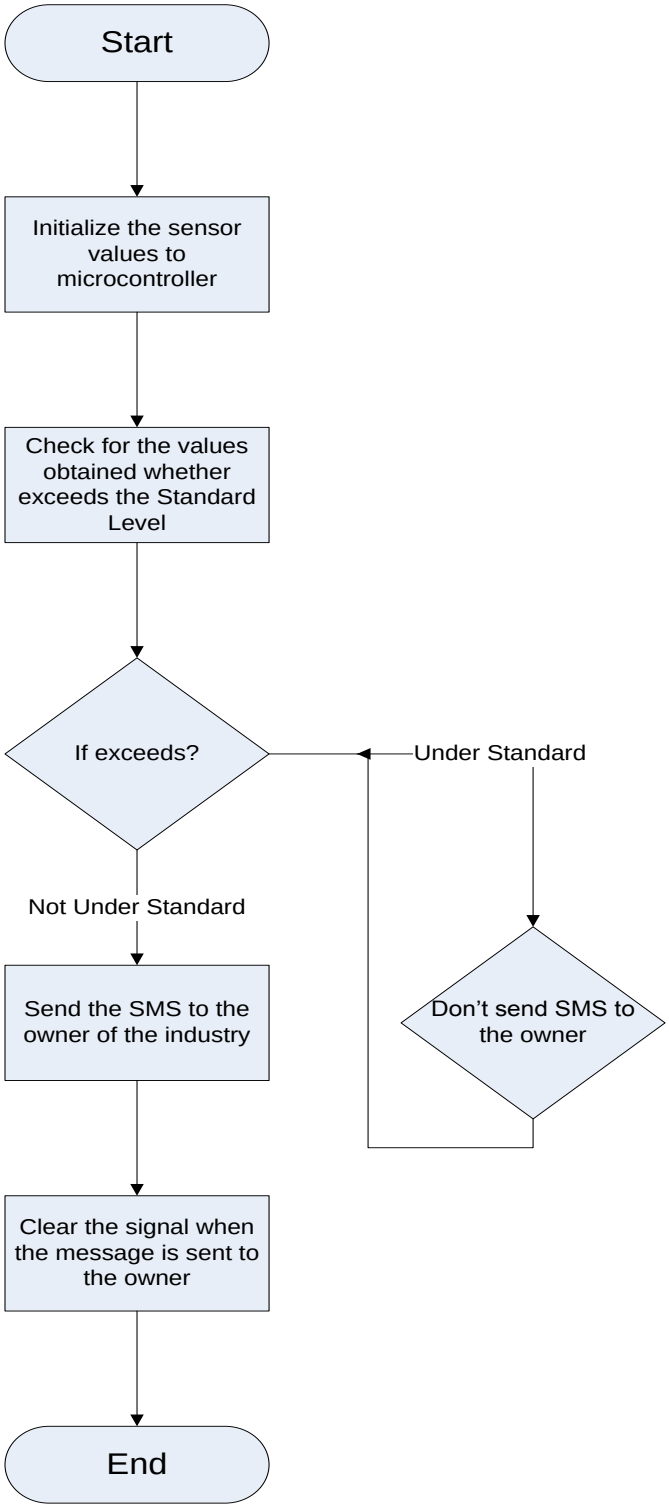

Figure 3: Flow chart to representing the idea

As shown in figure below the block diagram of the system the signals of gas found and water lever will be measure by the sensor and acquired by the controller. When the signal level measured exceeds the reference value as specified in the controller a message will be sent to the owner of the industry and after a specific interval of time if no proper measure is taken a message will be sent to the pollution control board through GSM.

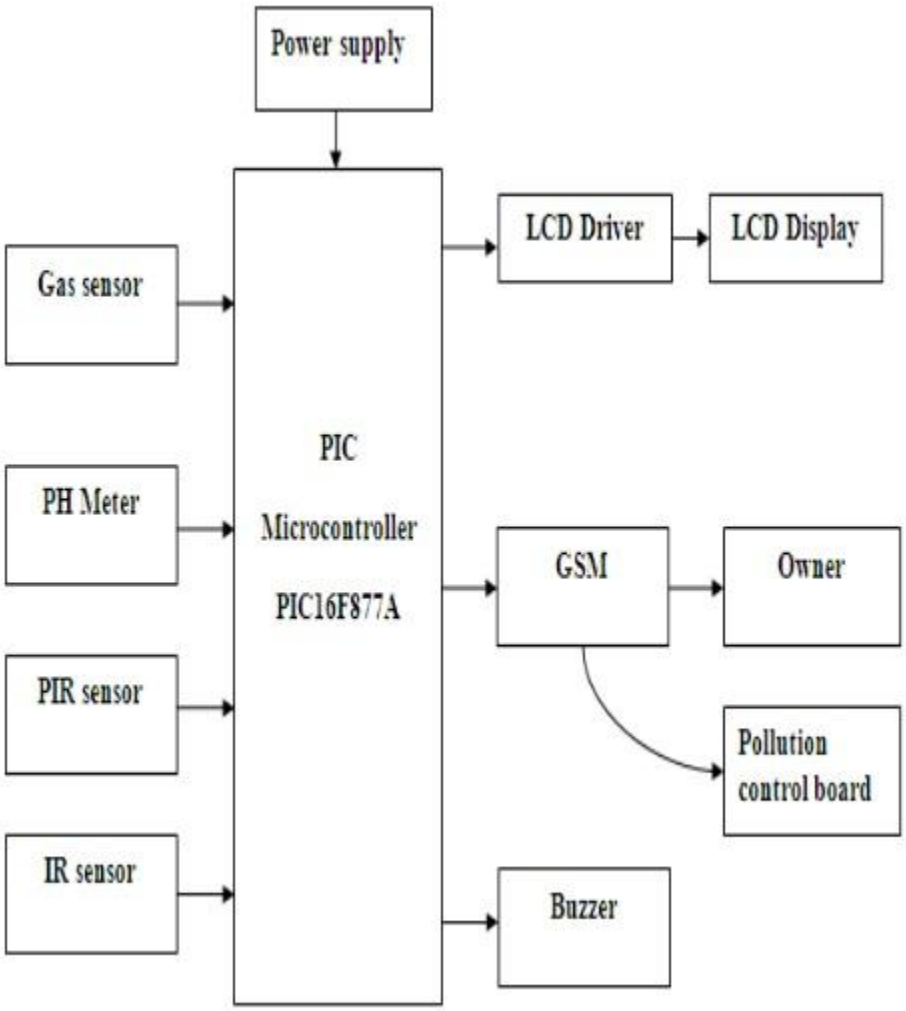

Figure 4: Block diagram of system

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8. Factors Affecting the Grade of Limestone:

- Deposit contains high amount of overburden and extremely contract space at mine face and due to high seat stature, limestone more often than not was blended with overburden.
- Limestone being exceedingly weathered and broke was found to contain colossal measure of dirt and intercalated rocks.
- Big rocks of limestone used to give high ashy than the finely pulverized limestone.
- Limestone hard and rough and shade of second rate and high review limestone extremely much similar with the exception of grain size. This made extremely troublesome in isolation at face and hand picking belt transport.
- Speed of hand picking belt being high it got to be mishap amid determination.
- Daily necessity of limestone being 1200 MT and it gets to be hard to spread on the thin face and for selecting just around 200-300 persons would be vital.
- Crushed limestone used to be tainted in the ground chute amid nourishing to ropeway.
- During downpours quality further detoriated because of wet earth blended with limestone. Because of these limestone mined and pulverized in Bhainse was antagonistically influenced in evaluation which was a genuine sympathy toward Hetauda Cement Industries Ltd as the plant must be authorized soonest conceivable.

9. Status of Cement Industries and Production in Nepal

Though there are several numbers of cement manufacturer's in Nepal. Nepal is still not capable to produce cement to fulfill its entire demands. Only 40% of the total consumption is supplied by the Nepalese cement industries in the fiscal year 05/06.

Fiscal year	**Utilization of cement (%)**
96/97	37
97/98	48
98/99	47
99/00	43
00/01	41
01/02	45
02/03	46
03/04	39
04/05	49
05/06	40

Sources: department of industries

10. Recommendation

In the current circumstance of Nepal, where development woks extraordinarily structures works of shopping complex, shopping centers and houses are in fast way, so concrete creation and its business sector is essential part of industrialization and business in Nepal. The majority of the interest of bond in Nepal is being satisfied by Indian organizations. Just 35% of the Nepalese business sector is involved by Nepalese bond. Nepal is honored in bond generation, with appropriate examination, speculation, strategy and neighborhood support Nepal can act naturally subordinate in bond creation in couple of years. The suggestion drawn from our studies are recorded as take after:

1: New mines ought to be concentrated on and new commercial enterprises ought to be urged to build up to satisfy the developing interest of concrete.

2: To control the evaluation of concrete in business sector, quality test and its area of expertise ought to be viable.

3: Proper impacting innovation ought to be utilized as a part of the mines to stop the debasement of lime content.

4: Mining act ought to be ideal to the neighborhood habitation and production line.

5: An administration must have some sort of modern approach, controlling mechanical situation, and mechanical contamination, financing and modern work.

6: The assessment framework must be streamlined. So the high tax assessment ought to be cutoff. Additionally the government ought to give adequate data, proposal to the commercial ventures, for further improvement, by leading distinctive customized.

7: Installation of the contamination control hardware like RABH and ESP ought to be made mandatory.

8: Modern innovation like CNC ought to be fitted to minimize the substantial and impalpable taken a toll.

11. Conclusion

After the fruition of our visit we inferred that the concrete business in Nepal has the wide scope as concrete is the real necessity of building and development of houses, structures, roadways, spans, and so on and some more. The interest of the bond in the Nepal is expanding quickly step by step however the creation of the bond is restricted in view of numerous reasons such as strike, load shedding, downtime disappointment, and numerous other. The full premise of turning plant is just in few concrete businesses like Udaypur, Maruti, and Hetauda concrete and rest of the bond commercial enterprises just have the granulating unit. Crude materials for the generation must be transported in from outside, for the most part clinkers are foreign made from Mirchaya, Siraha, Satna and Meghalaya course. Gypsum, Iron mineral are fundamentally foreign from Bhutan and India. Slags are for the most part imported from Asansoul, Durgapur and Calcutta of India.

On account of numerous breakdowns of machines hubers are fundamentally two in numbers to overcome it in instance of disappointment. Slags are for the most part foreign made as the repercussion of Calcutta Durgasteel and Hindustan steel. Coal utilized for warming and drying are transported in from India.

The RABH and ESP innovation once in a while utilized as a part of Nepalese concrete commercial enterprises has the immense huge and answer for biological equalization. The lime stones transportation from mines to the production line is likewise a noteworthy issue amid nearby strikes and bandh. The heap shedding timetable of NEA additionally seriously influences the generation as concrete commercial ventures requires huge feeder and expends colossal power.

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