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A Study on Design and Fabrication of Red Mud Filtration Machine

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Abstract – Special relation to red moth (RM) or bauxite residue produced by different aluminium industries in India, as often happens in industrial waste. This is an important topic for protection and the community. For alumina refineries, handling of red or bauxite residues is a key concern. The amount of 2,5 tons of red mud residue must be manufactured for each tonne of Al2O3 processed at the alumina refinery. The quantity of residue varies depending on the quality of the bauxite and the site of the alumina refinery. Most of the red mud has been deposited in mud-lakes and/or impoundment areas in recent years; this has been standard procedure at worldwide alumina refineries. Many refineries choose to manufacture a red-solid cake, friable and transportable by truck and conveyor, for pressure filtration. For industrial purposes, the bulky Red Mud behaviour and low caustic content are important problems for custom superior filtration technologies. The first part of the study text deals with a Red Mud Filtration and dieting process for the production of mud cake in general for industrial use and the efficient utilization of the filtering phase. The design and filtration of the system together with various components is done with CAD and CAM software (CATIA). The following section focuses on experimental procedures to increase the performance of the filtration system by calculating the design. As a consequence, the sodium content of red mud slurry decreased fairly from 10% to 20%. This makes the creation of red mud cake smoother compared with other filters well understood. Therefore the efficiency with regard to moisture content of the red mud filter machine is improved.

Keywords – Red Mud (RM), Red Mud Filtration Machine, Red Mud Management, CAD& CAM.

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I. INTRODUCTION

The Indian Aluminum Industry is one of India's leading industries. The aluminium sector in India is a highly concentrated industry with several of the country's five largest firms. As Indian aluminium demand rises, the Indian aluminium industry also grows at an enviable pace. Indeed, aluminium development in India is now beyond demand. India's most energy, consumer durables, shipping, building and packaging industries involve the aluminium industry. The aluminium industry will expand in India by diversifying and exploring new horizons for the industry. Hindalco and Nalco are now one of the most cost-effective in the world's aluminium processing. Bayer generally produces red bauxite aluminium sludge or waste as a by-product, known as red mud. Around 90 million tonnes of red mud are generated annually globally. But nowadays most of the aluminium industry is focusing on environmental sustainability how products produced by these factories, especially bauxite residues and red mud, can be reduced and reused in a different way since they have a serious environmental effect. New technology is specifically developed for use in all areas of industrial applications, such as the production of bricks, ground filling or use of cement.

Table: 1 Bauxite Production World wide

Country	Bauxite Mine Production (X 1000 Tonne)		Reserves
	2019	2020*	
United States	1093	1000	2093000
Australia	1570	1600	3170000
Bahrain	1370	1500	2870000
Canada	2850	3100	5950000
China	35,000	37,000	72000000
Iceland	845	840	1685000
India	3640	3600	7240000
Norway	1400	1400	2800000
Russia	3640	3600	7240000
United Arab Emirates	2600	2600	5200000
Other Countries	9200	9000	18200000
World Total (Rounded)	63,200	65,200	128448000

1.1 Bauxite: Introduction

"Bauxite" is usually not a stone. It is a rock made from laterite soil, severely sprinkled in a tropical or sub-tropical rainy weather with silica and other soluble materials. In 1821, Bauxite was named to Les Baux village in Provence in the Southern France by the French geologist Pierre Berthier where he found and became the first to acknowledge that it had aluminium. Bauxite is a composite of hydrous oxides from aluminium, aluminium and insoluble elements such as quartz, hematite, magnetite, siderites and goethite. The composition is composed of bauxite. Usually, bauxite is a soft structure of special gravity 2.6 to 3.5 (h: 1 to 3). light content. The ordinary bauxite colour is rose but when it is low in iron, it is likely to become white in colour and reddish brown in epistolic design as seen in Figure 2 with increasing iron colour.[1]

Fig.1: Bauxite Ore

The bauxite deposits in Indian sense are divided into five broad catagories, according to geological and geographical areas: Eastern Ghats, Central India, Western Coast, Gujarat, Jammi & Kashmir. Indian bauxite can be separated into fout groups, based on mineralogy and order of preference:[1]

1) Gibbsitic Bauxite

2) Mixed Gibbsitic- Boehmitic Bauxite

3) Boehmitic Bauxites

4) Diasporic Bauxites

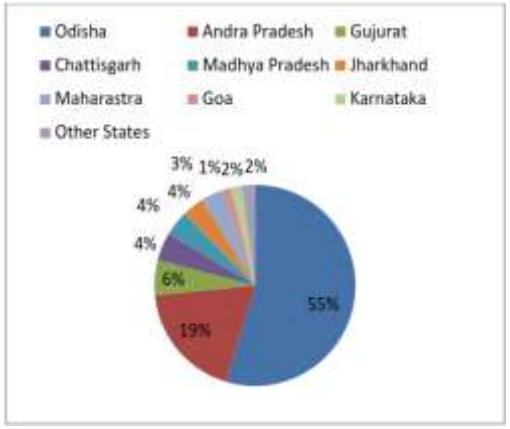

Fig.2: Distribution of Bauxite Resources Across India (In Million Tons)

Table 2: Chemical Composition of Bauxite

Sl. No.	Composition	% Percentage
1	Alumina (Al2O3)	33.21 to 7.69 %
2	Water(H2O)	8.62 to 31.42%
3	Iron Oxide (Fe2O3)	0.1 to 48.83%
4	Silica (SiO2)	0.3 to 37.81%
5	Titania (TiO2)	Up to 4 %

1.2 Bayer Process of Alumina Production:

The Bayer Process is the cheapest way of producing bauxite alumina. The bauxite from the mine is compressed and ground at the start of the operation and then blended into big claves with a solution of caustic soda. At 1-6 atm pressure and at temperature 110-270°C, the aluminium in the ore is dissolved into sodium aluminium. The bauxite silica normally behaves as a sodium aluminium silicate, which precipitates the solution. Iron, titanium oxide and other contaminants are not and are solid and chemically damaged. It is isolated from the sodium aluminium solution from this waste liquid, Identified as red mud and gradually dumped for regeneration of caustic soda into the disposal fields. The solution of hydroxide is dissolved and cooled to about 1000 C. The aluminium hydroxide Al(OH)3 (hydrargillite) is dissolved as a white fluffy solider by agitating and cooling to about 60°C. The aluminium hydroxide decomposes into alumina whether it is heated by rotor heaters or fluidized beds, at 1100°C to 1300°C (calcinated), thereby giving water vapour in which the hydroxide is converted to a dry, white powder. This powder consists with alumina of technical purity, comprising as many as 0.01–0.02% SiO2, 0.01–0.03% Fe2O3, and 0.3-0.6% NaO2 as impurities. Like this, a significant amount of the alumina created in this way is then smelted to manufacture aluminium in the Hall Heroult method. [1]

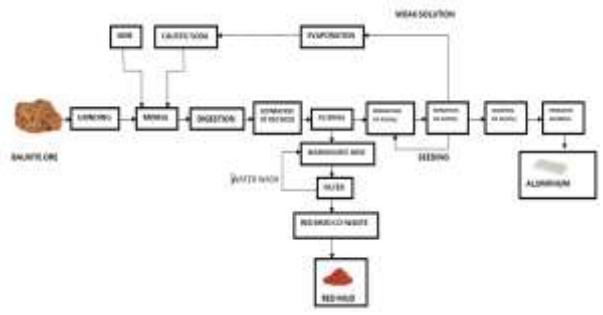

Fig.3: Overviews of Bayer Process from Bauxite to Aluminium

1.3 Production and Characterization of Red Mud:

During the aluminium production phase, It's made "Red Mud." A tonne of alumina manufactured depending on the raw material treated is given for 1-2,5 tonne of red mud. In India, approx. 5.71 million

tonnes, or 7.15 percent of the total world output, is generated last year.

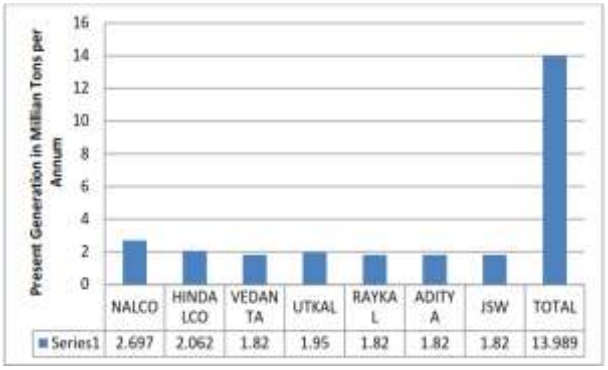

Fig.4: Red Mud Generation in India

Table 3: Typical Composition of Red Mud

Sl. No.	Composition	Percentage %
1	Fe2O3	30-60%
2	Al2 O3	10-20%
3	SiO2	10-20%
4	Na2O	2-10%
5	CaO	2-8%
6	TiO2	Trace-upto 25%

1.4 Red Mud Filtration Machine

Red Mud is a vital problem for alumina refineries or Bauxite Residue management. The quantity of residue varies depending on the quality of the bauxite and the site of the alumina refinery. Most of the red mud has been deposited in mud-lakes and/or impoundment areas in recent years; this has been standard procedure at worldwide alumina refineries. Many refineries want to manufacture a red mud cake that is strong, cold and transportable by camion or transport.

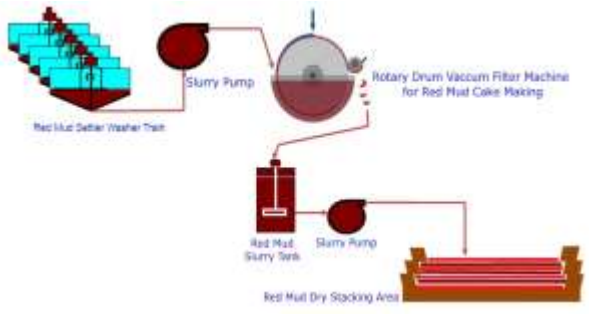

Fig.5: Red Mud Bauxite Residue Flow Pattern

The RDFV (Figure 9) has historically been applied in the event of red mud filtration for more than fifty years now and washed after the end washer. The filtration is carried out using vacuum to shape a semi-dry filter cake during the final stage of the CCD-settler-washer circuit. Additional cake washing on the RDVF is performed using a spray header with the use of wash liquor. The filters generate a filter cake of 50 to 65% solids for discharge. This thixotropic cake usually looks sturdy but the cake can be liquefied and pumped by scissors in a twisted vessel. Many alumina refineries are looking at ways for lower cakes filtering the moisture content in red mud disposal sites to minimise waste volumes. Pressure filters may make cakes that are very dry. Effective cake washing for caustic recovery are provided by filter presses. RDFVs play an important role in the resolution of the vast volume of red mud created by the machine to increase the recycling potential of caustic soda which is used in the process itself. In most cases RDFVs play a crucial role. [15]

1.5 Research Methodology:

Logical and rigorous research is established. The topic analysis is based on scientific and precise methodology and analyses consumer statistics. This study needs accurate details such that information gathered from consumers and certain information gathered from internet sources. I visited Hindalco (Aditya Birla Group), Hirakud, Sambalpur, Odisha to research the different processes and technologies and to recognise the different aspects of aluminium industry and management of red mud disposal. For industrial purposes, the bulky Red Mud behaviour and low caustic content are important problems for custom superior filtration technologies. The first phase of the study is on red mud filtration and dieting processes, which make mud paste for industrial purpose in general, and which efficiently use the filtration phénomene. Thus, system design and filtration along with many components was carried out with the help of CAD and CAM software. The following section focuses on experimental procedures to increase the performance of the filtration system by calculating the design. As a consequence, the moisture content of red mud slurries is observed to be somewhat smaller.

II. LITERATURE REVIEW

S. K. Tamotia (2000)' said that the industrial usage of red crazy and red mud was both experimental. For instance, red mud tiles, blades, bricks, windows of doors, etc.' [1]E. Balomenos, and others, (2011) have described economically the ability to dramatically enhance the diversity and profit margin of the aluminium manufacturing industry as well as resolving the red mud disposal crisis, a single phase of co-production of two highly precious byproducts (pig-iron and mineral wool). [2]These advances and improvements achieved that will be quite helpful in the light of environmental considerations for the disposal and usage of red mud have been analysed by the SuchitaRai et al. (2012). And as a consequence the restoration operation of the red mud ponds was performed." [3] The following: [3] The details of the different flow sheets and the effective mud disposal equipment are described in Avery and Wilson, (2013). Q. The test results reflect changes by form of machinery, geography and

various grades of bauxite ore. And the conditions of selection for specific refineries of alumina, including the key drivers; protection and environmental issues, water and caustic recuperation, storage and rehabilitation costs in waste areas." [4] Subbrat K. Rout et al.,(2013) discussed using red mud as the basis on laboratory research and finite element analysis in development of tailing dams. The geotechnical characteristics are provided such as plasticity, compaction, permeability, shear strength and red mud dispersion. The stable analysis and the filtration of tailing dams is seen in line with the finite element analysis by using the above geotechnical parameters." [5] HAREETNATH Harjeet Harjeet "The RM, PSA, XRD, FESEM, EDX, BET and FT-IR techniques are analysed in conceptual form and stage compositions with this paper," says Abanti Sahoo " (2014). "The status and potential trends of red mud characterization, disposal, different neutralisation methodologies, and use both in the world and in the Indian sense were examined by Sucharita Patel and B.K. Pal, 2015,".. [6]. "After several years of debate theoretically, industrial reuse of bauxite residues in the most advanced alumina refinery is now to be achieved," said ReinhardBott and Thomas Langloh, (2015). A bulky behaviour of the Red Mud and a low caustic content is the primary requirement for industrial application, which threatens a superior filtration technology, which is primarily used for easy separation, if the Red Mud is removed like a post." [8] "Red mud is agricultural waste in large volumes, and its handling is a particular task. PetrosKounalakis et al.,(2016). The study reveals that investments in an industrial plant that treats red mud and turns commercial materials into hazardous industrial waste are healthy and sustainable." [9] Li Wang et al., (2019) "The context, characteristics and applications of RM as an adsorbent are summed up as discussed. A thorough review and comparison of proper methods to removing metal and non-metallic materials from wastewater. The surface alteration of RM is emphasised to ensure strong adsorption. Finally, there is a thorough debate on the potential for future study in this area." [10] The report is in progress.

IIII. DESIGN AND MODELING OF RED MUD FILTRATION MACHINE

3.1 Red Mud Filtration Machine (Rotary Vacuum Drum Filter Machine):

With the Rotating Vacuum Drum Filter, the bottom feed category is the best component of the solid liquid separation operation, so rotor vacuum drum filters are surely used. Figure 6 displays the scheme views and the specifications with rotary vacuum drum filters. Figure 6 shows. A highly efficient liquid/solide isolation system is the herotary drum vacuum filter.

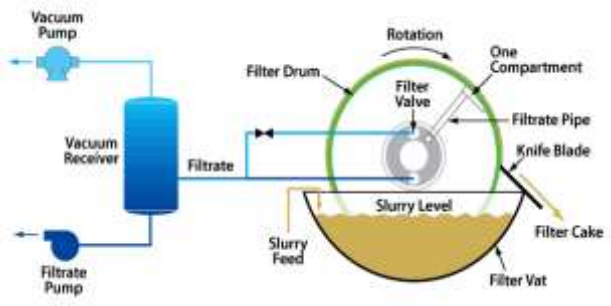

Fig.6: Schematic of Red Mud Cake formation in Rotary Vacuum Drum Filter Machine

When a certain cake purity is desired, cakes are washed. It also improves the removal from the filter cake of liquid components or dissolved compounds. The reliability and efficacy of cake washing on the rotating vacuum filter machine can be measured using laboratory pilot research.[2]

The drum is protected on the valve end that is bearing on the end of the drive by a wide trunnion diameter. Any single drum face forms one independent vacuum cell, separated into circumferential segments. Internal tubing linked to each industry passes via the trunnion and finishes of a wear plate with ports that match the amount of industries. [6]

Filter valve: A bridge valve manages the cycle sequence such that any sector is vacuum, blast and dead region. A valve with a bridge setting. When a sector reaches into an underwater setting, vacuum starts and begins to wash. Adjustable blocks enable optimization of the filtration period form-dry ratio as well as the "efficient submergence" of the drum if the amount of Red Mud in the tank is as high as possible. [6]

Vacuum Pump: A vacuum pump is an instrument that draws gas molecules from the enclosed volume such that a partial vacuum is left behind. The role of a vacuum pump involves the generation of a relative vacuum.

Vacuum Receiver: Air receiver tanks are designed for air storage or full vacuum receive service. It is made of steel structure.

Filter Pump: This pump mainly has the purpose of supplying red mud slurry for continuous filtering of vat. A pump-associated filter is used by drawing and going through different filter modes to clean the red mud from the red mud slurry tank and then put the red mud into a red mud tank.

Knife Blade: The blade of the knife has the purpose of constantly collecting the red crazy dry cake from the vacuum filter drum and places its conveyed location to quickly remove excess dry red mud cake.

Filter Vat or Slurry Tank: Filter Vat or Slurry Tank is fitted with slurry pumps and constantly supply the Red Mud Slurry to its upper surface.

One Compartment: There is one room inside the vacuum filter for gigantic water in the process of drying red mud cake.

The Cloth of the pump: The filter holds the red mud cake and attaches unique cords to the drum face in the grooved stripes. The filter cloths are currently made of synthetic materials with advanced layers to increase the drying quality. [18]

3.2 Red Mud Filtration Equation:

$$dt/dv=(\mu f)/(A(-\Delta P))[\alpha v/A\ v+Rm] \text{ ----------(i)}$$
$$t=(\mu f)/(A(-\Delta P))[\alpha v/A\ V2/2+RmV] \text{ ----------(ii)}$$

Where, t=time for red mud cake formation, if 'tc' is the time for one full rotation of the drum.

$$t=ftc\text{----------(iii)}$$

Where, f is the fraction of the cycle available for red mud cake formation.

f= fractional submergence of drum in the red mud slurry

V= Filtrate volume obtained in one drum rotation and (V/tc) represents the filtration intensity.

For Compressible Red Mud Cake,

$$\alpha=\alpha 0(\Delta P)x\text{----------(iv)}$$

$$ftc=[(\mu f\alpha 0v)/(2A2(-\Delta P)1-s)]+V2[(Rm\mu f)/A(-\Delta P)]V \text{ ----------(v)}$$

3.3 Formation of Red Mud Cake:

The "apparent submergence" usually amounts to 33-35% while the overflow is set at most, hence the slurry ranges are 04.00 to 8.00 hours. If a sector joins the submerging void, it begins to shape a cake before it comes from the slurry. The cycle part required for forming is "successful dip" and its length is determined by the number of sectors, the volume of slurry in the tank and the bridge positioning that monitors the shape to dry ratio. [6]

Continuous Removal of the Deposited Red Mud Cake: The thickness of the cake is not permitted to rise to high values, so a constant rate of pressure differential is needed for the filtration operation. The complete batch loop corresponds to a single drum rotation. The equation designed for batch filtration should also be used for continuous filtration, bearing in mind that the equation represents one complete batch rotation.

3.4 Washing and Drying of Red Mud Cake:

The drying part of the period begins after emergence and lasts until about 01.30 hours in non-wash applications with the vacuum cut. When cake washing is necessary, the washing would take place at about 10.30 to 11.30. The remainder is for the final drying of the coke at 1:30 hrs[5]. Once the whole field has its vacuum, the air cut off starts at about 02.00 hours to allow the discharge of the coke. The blow is cut out at about 03.00 hours, based on the location of the tip of the scraper blade. Drum filters are usually run at a low pressure blast, although a snap blow is added for certain applications, and it is preferred that the fabric is not snapped out of the tapers or ropes.

3.5 Modeling of Red Mud Filtration Machine:

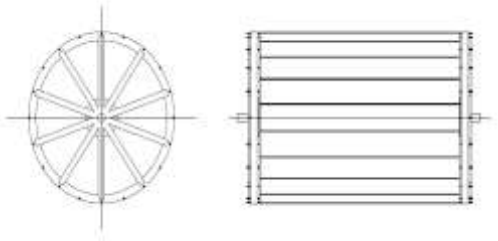

Fig.7: CAD Model of Red Mud Filtration Machine

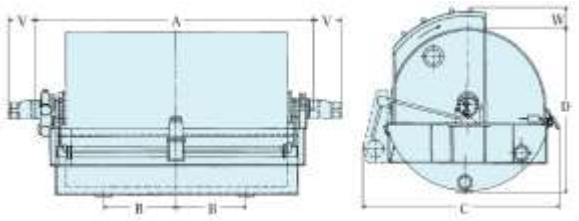

Fig.8: CAD Modeling of Red Mud Filtration Machine

3.6 Parameters of Red Mud Filtration Model:

1) Horizontal drum which rotates in a red slurry trough at 0.1-2 r/min.

2) Medium of the filter exposes a partly submerged drum face

3) Vacuum & air are used as the drum rotates alternately

4) The washing liquid pulled through the pump is drawn while the panel exits slurry areas, so the red mud cake is sucked with the air and then the cake is scrapered down.

5) The filter field may be submerged from 30% to 70%

6) Usually 3 mm to 40 mm thick red mud cake

7) Drum size varies from 0.3 to 3 m in diameter.

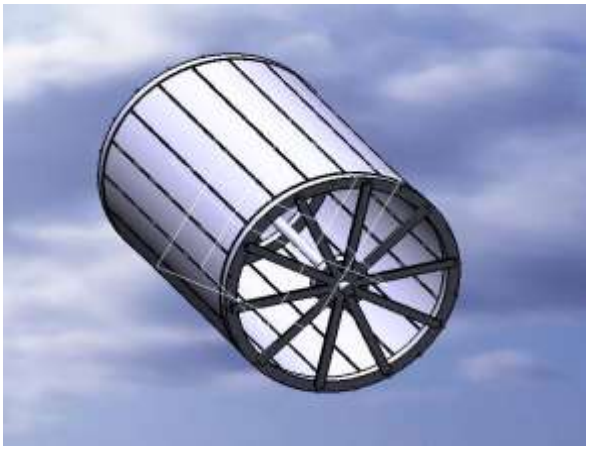

Fig.9: CAM Modeling of Red Mud Filtration Machine Drum

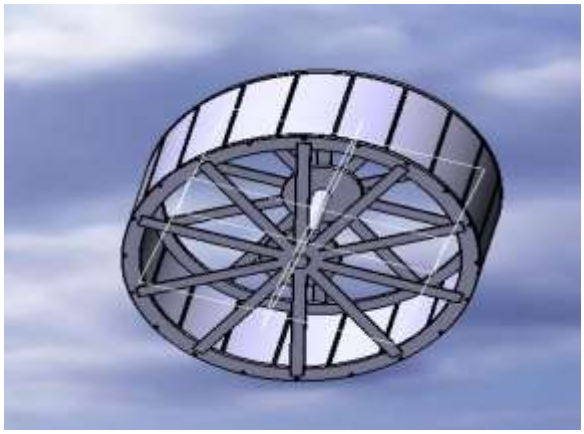

Fig. 10: CAM Modeling of Red Mud Filtration Machine Drum

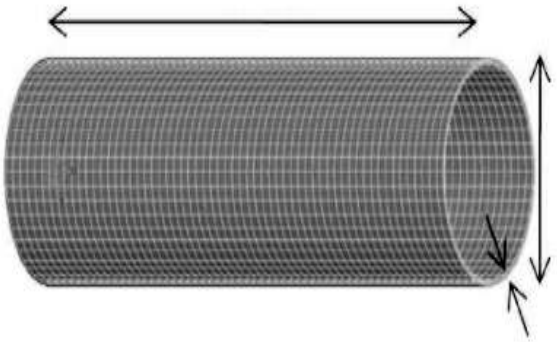

Fig. 11: Mesh Model of Red Mud Filtration Machine Drum

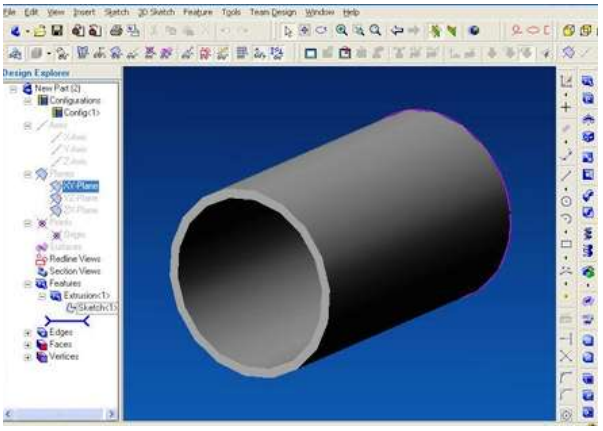

Fig. 12: Solid Model of Red Mud Filtration Machine Drum

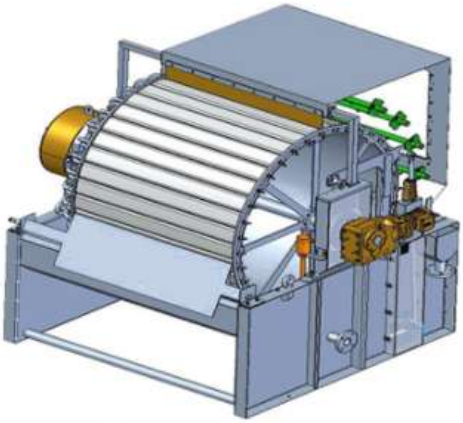

Fig.13: Final CAM Model of Red Mud Filtration Machine

Following the formation of the CAD and CAM models, the MATLAB programme validated and interpreted this model for the control of various operating parameters of the vacuum drum filter. For example, the following findings were obtained when vacuum drum filter with a surface of 1.0 m2 worked on a constant pressure of 1.8 bar.

Table 5: Filter Surface Operated at a Constant Pressure

Filtrate Volume (m^3)	3.991	6.090	7.650	9.631	11.330
Time (min)	10	20	30	45	60

The "Red Mude samples slurry" had around 10% strong residue, such as silica and caustic, and the Red mud cake was practically incompressible, by weight of specific gravity. The time necessary for washing the red bowl created at the end of a 70-minute filtering by using the same pressure at 3.0m3 was calculated with the aid of MATLAB software programming special relation to the simulation at the start.

3.7 MATLAB Programming:

Solution:

```
% input
fs=1;%filtering surface=1m^3
p=1.8;%constant pressure=1.8bar
x=0.1;%weight % of red mud slurry
up=2.72;%70 mins of filtering
tf=tf*60;
vw=3;%volume of wash water m^3
tetc=360;

t=[10,20,30,45,60];% t time in mins
fv=[3.99,6.09,7.65,9.63,11.33];%fv=filterat
e volume (m^3)
n=5;%n=number of valves of filteration
volume
dt=size(n-1);
dfv=size(n-1);
df=size(n-1);
dt=size(n-1);
for i=1:n
t(i)=t(i) *60;
end

for i=1:4
dt(i)=t(i+1)-t(1);
dfv(i)=fv(i+1)-fv(i);
df(i)=dt(i)/dfv(i);
av(i)=fv(i)+5*dfv(i);
end
```

```
disp('time in sec=');disp(t);
disp('filtrate volume(m^3)=');disp(fv);
disp('delta t=');disp(dt);
disp('delta v=');disp(dfv);
disp('delta t/delta v=');disp(df);
disp('v avg=');disp(av);

w=polyfit(av,df,1);
b=w(2);%intercept
kp=w(1);%slope
disp('slope(sec m^6)=');disp(s);
disp('intercept(sec m^3)=');disp(b);

vf=b*b+4*tf*kp;
vf=sqrt(vf);
vf=vf-b;
vf=vf/kp;disp('volume
final(m^3)=');disp(vf);
rw=vf*kp+b;
rw=1/rw;
tw=vw/rw;
disp('t wash=');disp(tw);disp('sec');disp('
');disp((tw/60));disp('min');

vo=tetc/(r*kp+.5*kp);
vo=sqrt(vo);
disp('voulme final optimum
(m^3)=');disp(vo);
Tc=(r*kp+.5*kp)*vo*vo+(b+r*b)*vo+tetc;
disp('optimum cycle time (sec)=');
disp(tc);
disp(tc/3600);disp('hr');
```

Output:

```
Time in sec =
 600          1200          1800          2700          3600
Filtrate volume (m^3) =
3.900         6.0900   7.6500        9.6300        11.3300
Delta t =
600           600           900           900
Delta v=
2.1000        1.5600   1.9800   1.7000
Delta t/ Delta v =
285.7143      384.6154      454.5455      529.4118
Output:
V avg= 5.0400          6.8700   8.6400        10.4800
```

Slope (Sec m^6) = 44.2873
Intercept (Sec m^.3) = 70.0130

Volume final (Sec m^3) = 12.2817
Rate of washing (m^3/s) = 0.0016
t wash = 1.8418e+ 003 sec
30.6967 min
Ratio =0.2443
Volume final optimization (m^3) = 10.4507
Optimum cycle time (sec) = 8.1104e+003
2.2529 hr

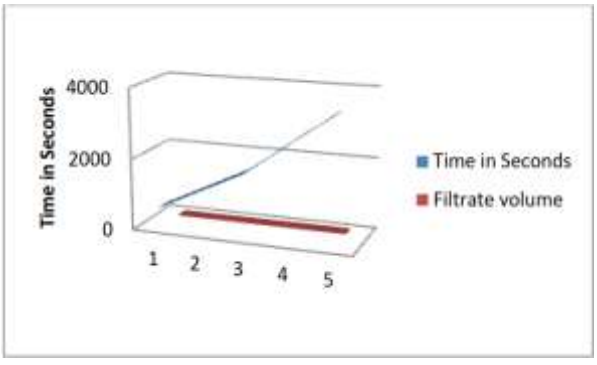

Fig.14: Comparison of Filtrate Volume Vs. Time in Seconds

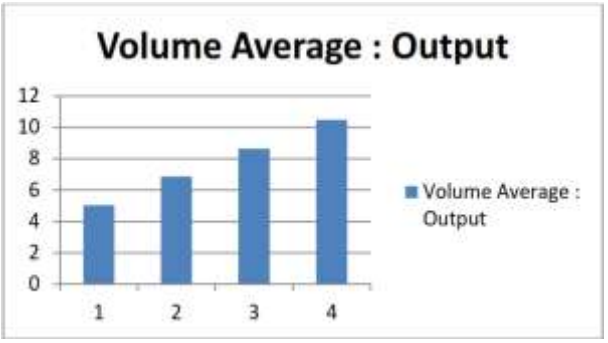

Fig.15: Output Volume Average of Red Mud

IV. RESULTS AND DISCUSSION

4.1 Red Mud Slurry Analysis:

The original calcium hypochlorite slurry humidity is determined using experimental methods. The first step is to determine the weight of the dry and wet cake and use these findings to calculate the original humidity value. Table 6 and Table 7 tabled the readings.

Fig.16: Rotary Vacuum Drum Filter Model for Experimentation

4.2 Calculation of form filtration rate: (Kg/h/ft2)

Filtration Rate = (Dry solids/1000) x (1/form time) x (1/leaf area)

For First Test (31.5/1000) x 3600 x (1/5) x (1/0.1) = 230.8 Kg/h/ft2

4.3 Calculation full scale filtration rate: (Kg/h/ft)

Filter Rate = Form filtration factor x Submergence xScale up factor

= 226.8 x 0.8 x 0.33 = 59.8 Kg/h/ft

Leaf area is found out by measuring the outer surfacearea of the filtering medium.

Table 6: To Find the Red Mud Cake Weight

Experiment No.	Initial Plate Weight (gm)	Weight of Plate + weight of Red Mud Wet Cake (gm)	Weight of Plate + weight of Red Mud Dry Cake (gm)
1	34.90	119.80	66.42
2	34.80	158.80	81.61
3	32.90	181.70	89.21
4	32.60	202.80	98.01

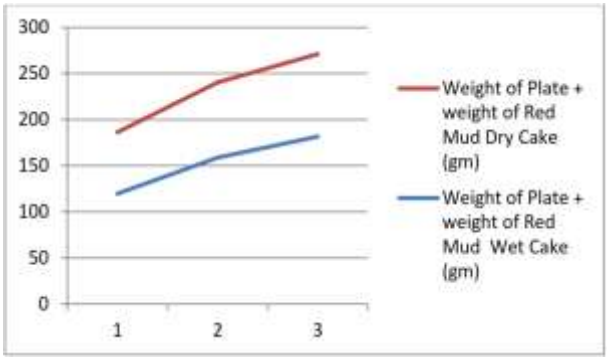

Fig.17: Comparison of Weight of Dry Cake Vs. Weight of Wet Cake of Red Mud

Table 7: To Find the Initial Moisture Content in Red Mud Cake

Experiment No.	Filtering Time of Red Mud Slurry(Sec)				Red Mud cake Weight (gm)		Percentage of Moisture
	Form	Wash	Dry	Cake Crack	Wet	Dry	
1	5	30	60	YES	84.92	31.51	62.82
2	10	30	60	YES	123.94	46.72	62.38
3	15	30	90	YES	148.83	56.33	62.17
4	20	30	90	YES	170.22	65.41	61.59

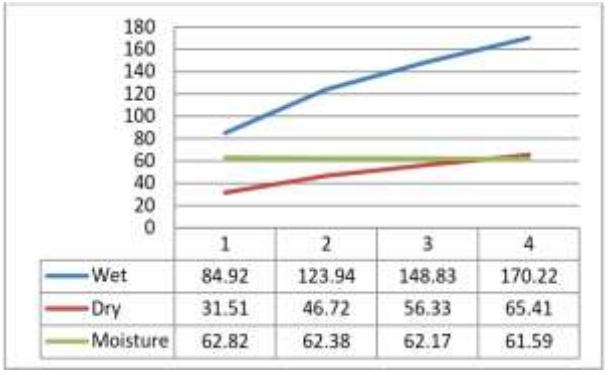

Fig.18: Moisture Content rate of Wet and Dry Red Mud

Table 8: To Find the Filtration Rate of Red Mud Slurry

Experiment No.	Form Filtration Rate(Kg/h/ft²)	Full Scale Filtration Rate(Kg/h/ft²)
1	230.83	59.84
2	182.13	44.37
3	138.11	35.67
4	98.37	26.75

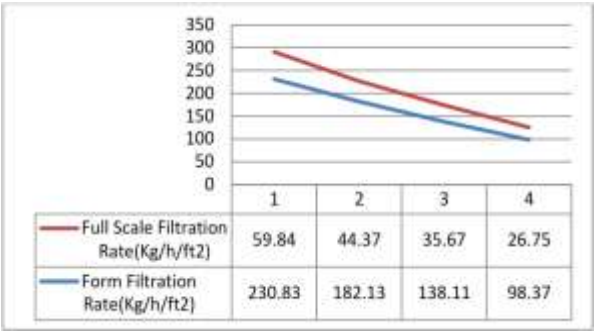

Fig.19: Full Scale Filtration Rate Vs. Form Filtration Rate of Red Mud

At vacuum pressure sustained at 500 mm Hg. Finally, during the experiment, vacuum pressures are said to be less than 450 mm Hg.

Filter Area =(Slurry flow x % dry of solids) / Filtration Rate= 35.6 ft2

So, now we can calculate the rotary vacuum drum filter

Area = Kr2 = 3.14 x 4 x 4 = 50.24 ft2

This 4ft x 4 ft. revolving drum will then be appropriate for the given slurry. This is fine for the operation. In this experiment the weight of the dry and moist cake is initially calculated and these measurement effects are used to determine the initial moisture value. Table 8 showed the readings. The diagram is now drawn with the values entered between Form filtration rate Vs Time. The vacuum is kept at a pressure of 500 mm Hg. Finally, during the experiment the vacuum pressure is recorded to be lowered to 450 mm Hg.

Filter Area = (Slurry flow x % dry of solids) /Filtration Rate= 41.66 ft2

So, now we can calculate the rotary vacuum drum filter Area = Kr2 = 3.14 x 4 x 4= 50.24 ft2

This revolving 4ft x 4 ft drum will then be the right drum for this particular litter. This is fine for the operation. The moisture content of red mud slurries is quickly decreased by 10 to 20 percent as a result. Thus the experiment makes the creation of red mud cake smoother than other filters. The efficiency of the red mud filter system in terms of its moisture content is then improved.

V. CONCLUSION

For alumina refineries, handling of red or bauxite residues is a key concern. The amount of 2,5 tons of red mud residue must be manufactured for each tonne of Al2O3 processed at the alumina refinery. The quantity of residue varies depending on the quality of the bauxite and the site of the alumina refinery. Most of the red mud has been deposited in

mud-lakes and/or impoundment areas in recent years; this has been standard procedure at worldwide alumina refineries. Many refineries look to filtrate the friction to render a red mud cake into a high-solid, fryable and conveyor belt. For industrial purposes, the bulky Red Mud behaviour and low caustic content are important problems for custom superior filtration technologies. The first part of the study text deals with a Red Mud Filtration and dieting process for the production of mud cake in general for industrial use and the efficient utilization of the filtering phase. The design and filtration of the system together with various components is done with CAD and CAM software (CATIA). The following section focuses on experimental procedures to increase the performance of the filtration system by calculating the design. The humidity content of red mud slurries was therefore observed to decrease significantly from 10 to 20 percent. Thus it is simpler to shape the red dung cake than other filters. It is well known. The efficiency of the red mud filter system in terms of its moisture content is then improved.

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