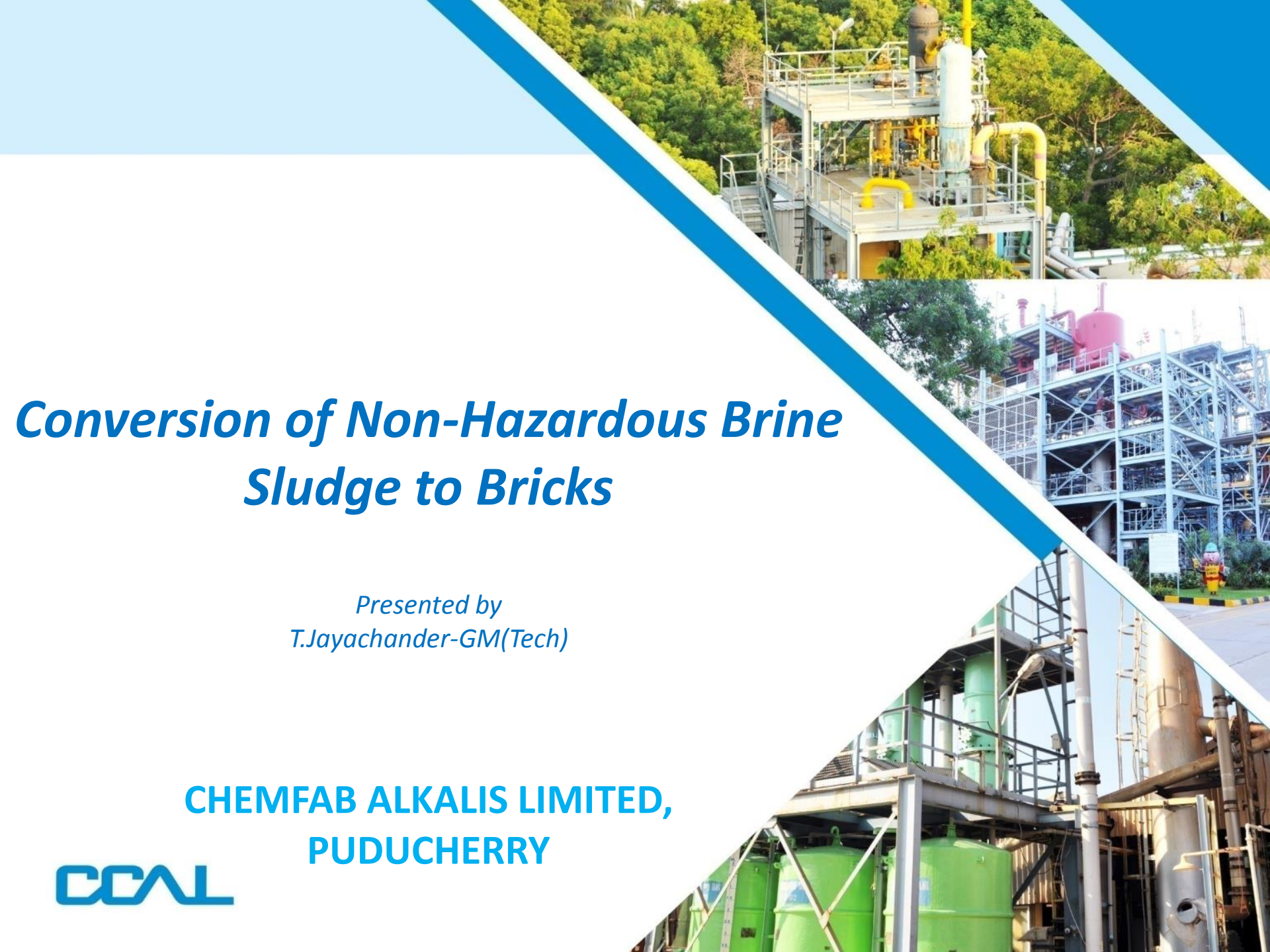


Conversion of Non-Hazardous Brine Sludge to Bricks

Presented by
T.Jayachander-GM(Tech)

CHEMFAB ALKALIS LIMITED,
PUDUCHERRY

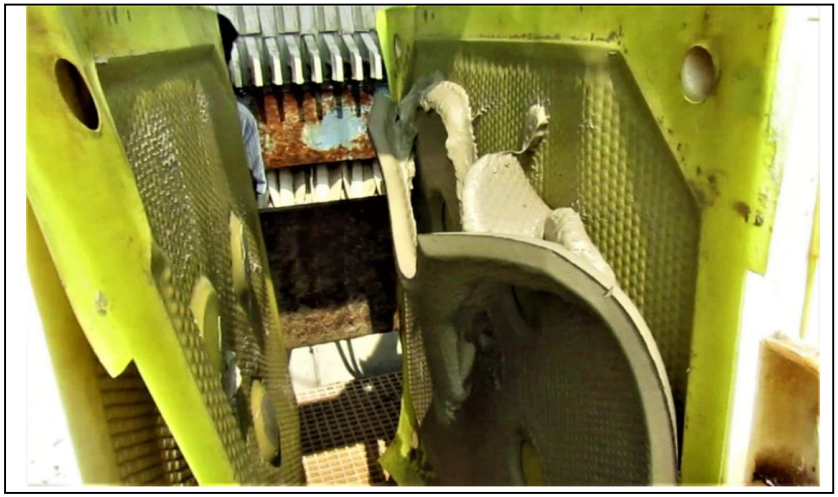
INTRODUCTION

- **CHEMFAB ALKALIS LIMITED (CCAL) was the first membrane Chlor-alkali Plant in India.**
- **First in the Chlor-alkali sector to implement various innovative technologies.**
- **Programmes for eliminating treatment chemicals, recycling of liquid and solid waste was taken up from the year 2000.**

SUSTAINABILITY TARGETS

- Power - *working towards renewables*
- Water - *Water positive goal established (Seawater Desalination)*
- *Elimination or substitution of process treatment chemicals with environment chemicals.*
- *Optimized water consumption and nearing ZLD.*
- ***Conversion of the solid wastes to saleable product.***

CONVERSION OF BRINE SLUDGE TO BRICKS



Chloralkali Industry : (Brine)

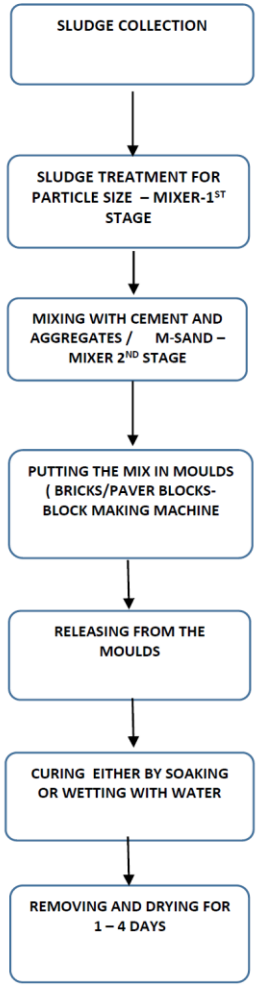
- Industrial grade salt is one of basic raw material in Chloralkali production. The salt contains Calcium, Magnesium and IR as impurities.
- Separation of these impurities in the brine results in the generation of brine mud or brine sludge.
- The sludge is separated and is being used for the preparation of the bunds in our own salt fields.
- Major components in the brine sludge are Calcium Carbonate (13 - 18%), Magnesium Hydroxide (1.5 – 11%) , and Insoluble residue (silica) (11.5 – 29%).

METHODOLOGY

- Attempts were made by various industries using this sludge for making bricks, but were not successful.
- The sludge characteristics was studied in detail and the reason for the non-binding property was identified and developed.
- Sludge is first treated for particle size and subsequently mixed with aggregates, cement and cast into bricks/blocks.
- Aggregates can be substituted with fly ash or mineral sand.

METHODOLOGY

Fig:1 – FLOW CHART OF THE PROCESS



- Bench and pilot studies were carried out and the properties of the bricks was tested.
- Stabilized the process of making bricks with 30 % sludge composition.
- Properties of the bricks/blocks tested at the Civil Engineering Dept, Pondicherry Engineering College.
- Brick properties :

  a) Water absorption < 20 %

  b) Compressive strength : 2.6 – 10 Mpa

  c) TCLP test passed.

METHODOLOGY

MIXER MACHINE

CONVEYOR

- The upscaled plant comprises of two mixers of capacity 250 kgs & 500 kgs with conveyors, hopper and the block making machine.
- The plant has the capacity to produce 23570 units per day.
- The ingredients sludge, aggregates and cement will be mixed and cast into blocks/bricks.
- The bricks/blocks will be cured with water and dried before despatch.

S.NO	TYPE	SLUDGE (%)	COMPOSITION (Cement:Sludge: Aggregate)	SIZE (mm) LXBXH	WEIGHT OF SINGLE UNIT (Kgs)	BULK DENSITY (MT/Cu.m)	LOAD BEARING (KN)	COMPRESSIVE STRENGTH (N/mm2)	IS 2185 STANDARD FOR CLASS'A'-BULK DENSITY	IS 2185 STANDARD FOR CLASS'A'-COMPRESSIVE STRENGTH
1	BRICK	33	1:2:3	230X100X75	4	2.3	237	**10.3**	>1.8	**10-15**
2	BRICK	33	1:2:3	230X100X75	3.7	2.1	320	**13.9**	> 1.8	**10-15**
3	BLOCK -6"	33	1:2:3	400X150X200	25	2.08	328.8	5.5	> 1.8	4 - 5
4	BLOCK - 8"	33	1:2:3	400X150X200	33.7	2.8	413	**6.9**	> 1.8	**4 - 5**
5	BLOCK - 8"	36	1:4:6	400X150X200	34	2.8	206	**3.43**	> 1.8	**4 - 5**

REPLICATION

- For every ton of salt used, the sludge generation will be in the range of 20 – 50 kgs depending on the quality.
- There are 33 Chloralkali Industries in India and the generation of the sludge will be approx. 2.0 lakh tonne per annum.
- At present, the sludge is stored within the premises or sent to secured land fill.
- The Chloralkali industry operations will become more sustainable through the use of sludge for construction activities.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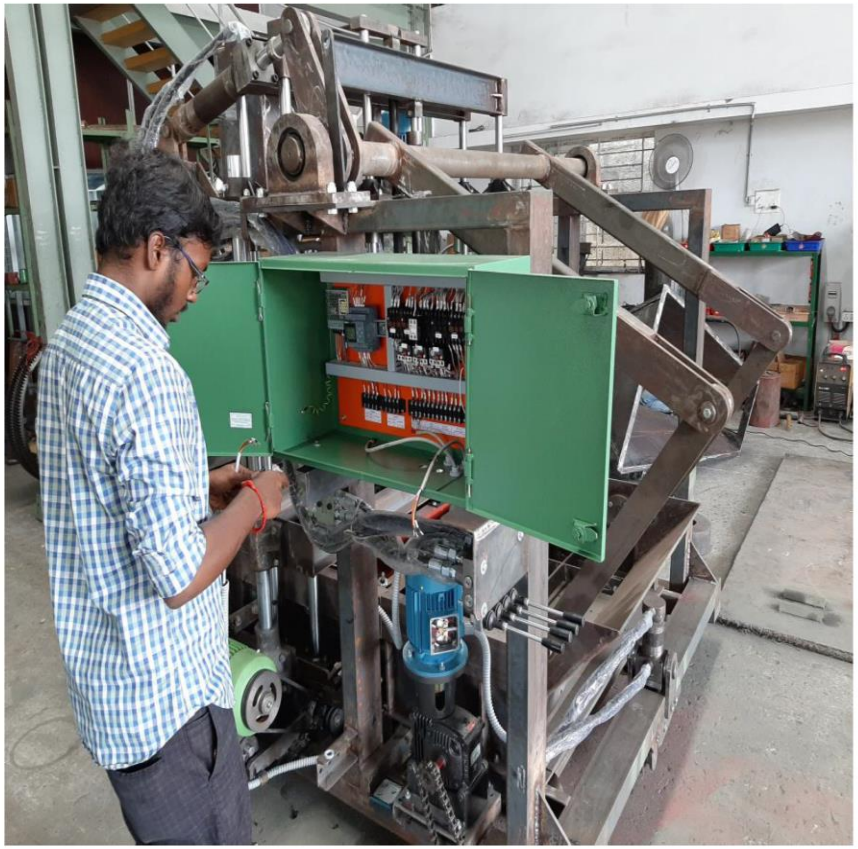

PROCESS PATENTED

Controller General of Patents, Designs & Trade Marks

सत्यमेव जयते

G.A.R.6
[See Rule 22(1)]
RECEIPT

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

Docket No 42602

Date/Time 2018/06/08 20:21:47

To
SHRI SRINATH SRINIVASAN

UserId: lrswami

L.R.SWAMI CO. 3, PLAYGROUND VIEW STREET, NANDANAM EXTENSION, CHENNAI - 600 035.

CBR Detail:

Sr. No.	Ref. No./Application No.	App. Number	Amount Paid	C.B.R. No.	Form Name	Remarks
1	R20184017232	201841021599	20000	15978	FORM 18	
2	201841021599	TEMP/E-1/22891/2018-CHE	9600	15978	FORM 1	METHOD FOR MANUFACTURING BRICKS/BLOCKS FROM BRINE SLUDGE GENERATED FROM CHLORALKALI PLANT

TransactionID	Payment Mode	Challan Identification Number	Amount Paid	Head of A/C No
N-0000383307	Online Bank Transfer	02806340806201851017	29600.00	1475001020000001

- This project being unique to the Chloralkali Industry, a patent was filed for the process. (Patent Application no. 201841021599)

BENCHMARK

- This project is first of its kind in the Chloralkali Industry.
- CCAL has established itself as being the leader of innovations in the Chloralkali Process in India after it brought the first energy efficient, mercury free Chloralkali technology into India.
- CCAL has set the benchmark for the industries in this sector and making the sector look vibrant in terms of energy efficiency and pollution control.

Thank You

CCAL

CHEMFAB ALKALIS LIMITED

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