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Experimental and Analytical Investigation for Reduction in Cost of Polyurethane Waste Disposal at Adani Hazira Port Pvt. Ltd.

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***Abstract:** Adani hazira Port handles all types of cargo including bulk, break-bulk, bulk liquid chemicals, petroleum products & edible oil, containers, automotive and crude. project includes to investigation and estimation of reduction in cost of pig foam by experimental data collection and analysis of the pig foam for manufacturing of foam squeezing machine. and study the property of same.Adani is facing issue of more use of polyurethane foam, high disposal cost of polyurethane, higher time of reutilization. pipeline clearance is done with pigging operation. work plan is to Reduction in cost of foam pig utilization per annum, reduction in cost of polyurethane foam disposal.*
***Keyword:** 1. Project Management , 2. Waste Management, 3. Pipeline management , 4. Mechanical Engineering.*

I. INTRODUCTION

Project is related to waste utilization method, as Adani Group uses polyurethane foam to clean the pipelines through which various chemicals are transferred to desired tank and then after transferred to road tanker. After transfer chemical through pipeline there is required to clean pipe. So for cleaning pipeline, Adani uses pigging operation in polyurethane foam has been passes though pipelines by applying air pressure.

The problem is polyurethane foam it is not used again instead it is dumped, so project concept is working on this problem as well as also looking after to design a machine which can make this polyurethane foam in dry state after being used. Reutilization of foam pig and reduction in cost of waste disposal (via transportation) through design of foam pig squeezing machine.

Adani Port Pvt. Ltd. is strategically located on the west side of the Hazira peninsula at approximately Latitude: 21° 06’ North, Longitude: 072° 37’ East.

Port handles all types of cargo including bulk, break-bulk, bulk liquid chemicals, petroleum products & edible oil, containers, automotive and crude.At Port, 2 berths and 1 dedicated liquid berth are equipped with different types and sizes of pipelines from jetty to tank farm to ensure safe and efficient handling of liquid products in big parcels.The tank farm and the infrastructure at the liquid terminal ensures best in class storage, safe and contamination free handling of including veg oil, chemicals and petroleum, oil & lubricants products.

II. FEATURES OF LIQUID TERMINAL.

A. Storage of petroleum class A/B/C.
B. All tanks a per API 650 & OSID 118 gidelines.
C. Modern , efficient automation system for monitoring and comtrol.
D. Dedicated pump for each tank.
E. Tank farm management system for inventory and safe operations.
F. Tank farm has a combination of SS tanks of existing 2,00,000kl commissioned for wide range of petrochemicals and petroleum product. Total 4,44,000kl storage capacity.
G. The portals handles liquid in bulk including Methanol, Ethanol, Acetic Acid, Phenol, Ethylene Di-Chloride (EDC), N-Butanol, Heavy Aromatic oil, etc.

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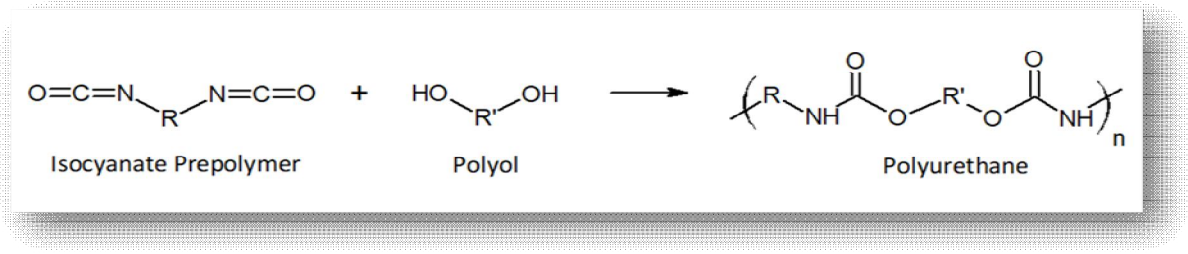
Figure 1. LIQUID TANK



1) PU (Polyurethane) Property

a) Low viscosity
b) High elongation
c) Good flexibility
d) Good tear strength
e) High toughness
f) Good impact resistance

2) Advantages

a) High abrasion resistance
b) Good low temperature capability
c) Wide molecular structural variability
d) Ambient curing possible
e) Comparatively low cost

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3) Disadvantages And Limitations

a) Poor thermal capability
b) Poor weather ability
c) Attacked by most solvents
d) Utilize toxic isocyanates
e) Flammable

4) Pigging

It mostly used for cleaning and batching operation, following are the operation and reason to implement pigging.

Figure 2. Pigging Pipeline

a) To clean up pipelines before use.
b) To fill lines for hydrostatic testing, dewatering following hydrostatic testing, and drying and purging operations.
c) To control liquids in a pipeline, including two-phase pipelines.
d) Pigs travel at about the same velocity as the fluid in the pipeline and travel speed is relatively constant.

III.PIGGING OPERATIONS

1) Pigs are used in all types of pipelines to increase efficiency and avoid problems at pump or compressor stations that could result from the presence of unwanted materials. Brushes and scrapers on a cleaning pig remove dirt and scale from the pipeline walls. Brush and scraper pigs feature longitudinal boles, which pass through the body of the pig. The holes allow a flow of fluid through the pig to prevent the build-up of wax or debris in front of the pig.

2) Pipelines are often pigged first during testing following construction. Most pipelines are tested with water (hydrostatic testing) either in sections or over the entire length. A foam pig or pigs is normally sent ahead of the water when filling.

3) After testing, the water is usually displaced with the fluid to be transported in the pipeline. A pig is run between the two fluids to separate them. In gas pipelines, the pig is used to “dewater” the pipeline by running it behind the test water. Additional pigs may also be run to ensure that as much moisture as possible is removed from the line.

Fig.4. PIG foam

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Fig.5. USED PIG.

IV. DESIGN OF ASSEMBLY

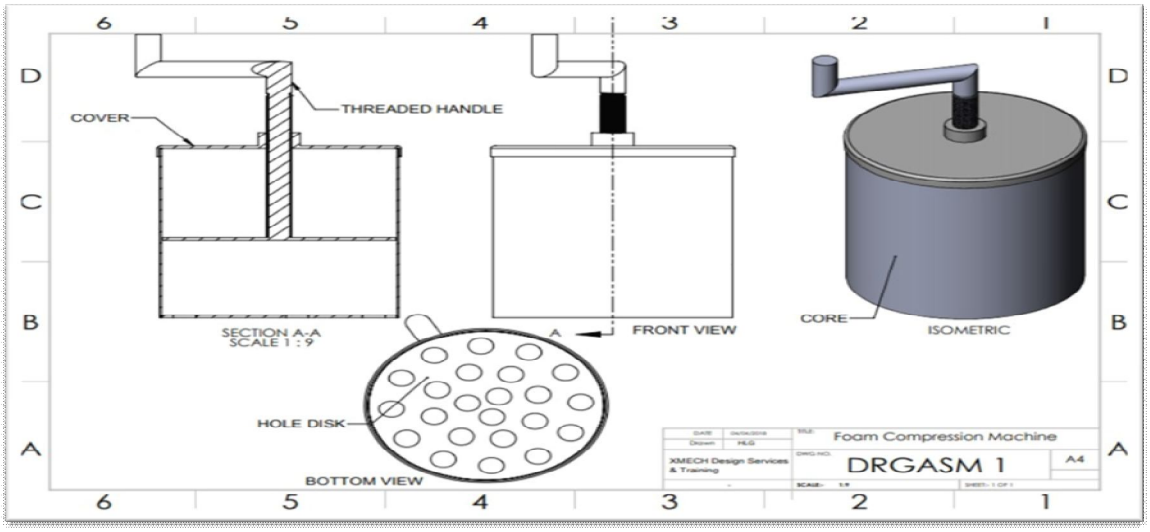

Fig.5. Design of Machine

4) Following shows assembly of all the components describe above with all design and safety criteria. Foam squeezing machine design in order to reduce stress which being felt into manually compressing machine.

V. CONCLUSION

Machine was proposed with screw jack mechanism in order to compress foam. Certain areas due to which machine had been not implemented for squeezing. variation in size and diameter of foam material so for that different machine required, actual load may differ from original load, time consuming, for large quantity higher man power required.

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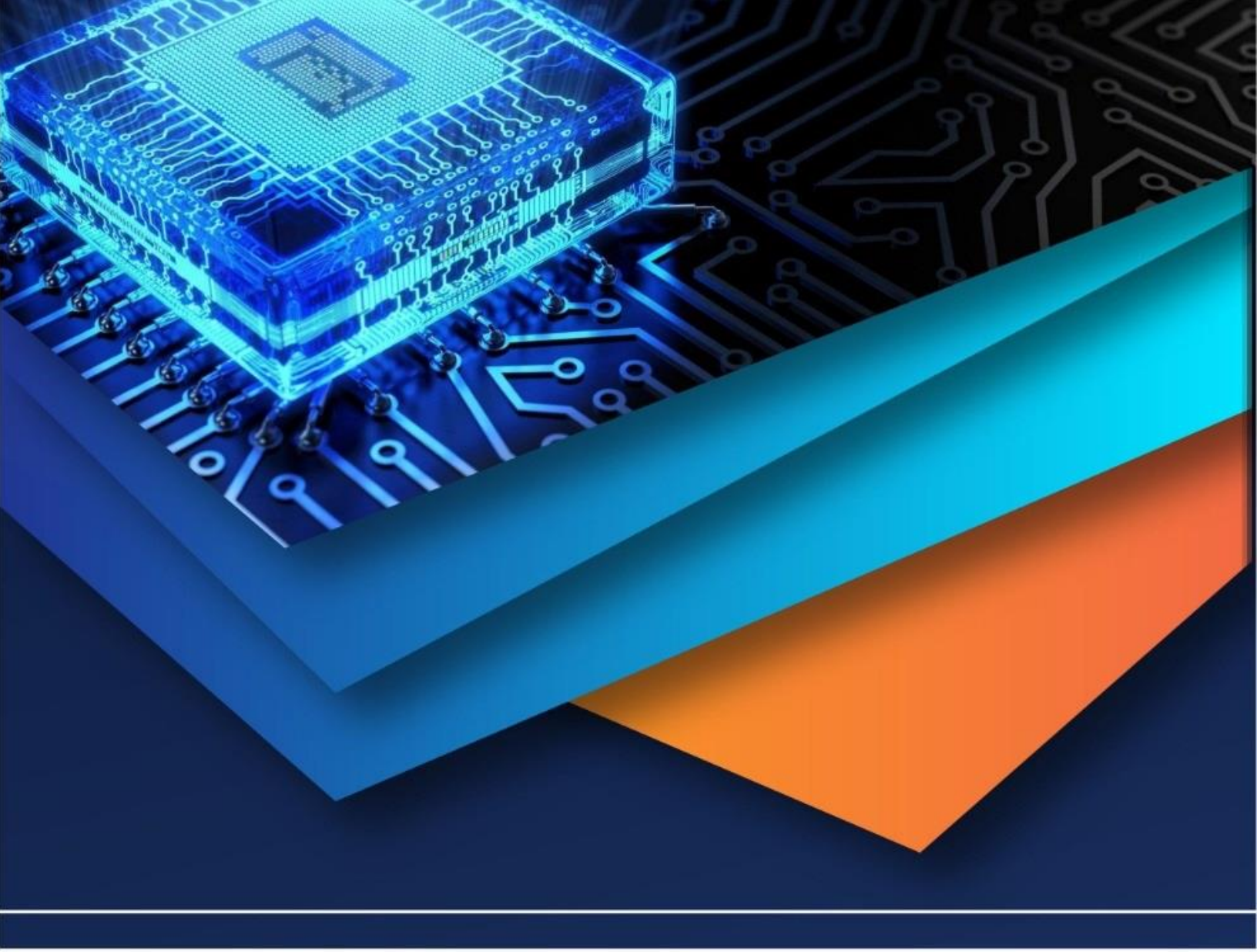

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