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VIDYAVARDHINI'S NATIONAL CONFERENCE ON TECHNICAL ADVANCEMENTS FOR SOCIAL UPLIFTMENT VNC - 2020 TASU 4TH APRIL, 2020



Organized by:
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K.T. Marg, Vasai (W) - 401202
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About us:

Vidyavardhini means a Body committed to enhancement of Knowledge. Vidyavardhini was established as a registered society in 1970 by late Padmashri H. G. alias Bhausaheb Vartak for the noble cause of education in rural areas.

Vidyavardhini's College of Engineering and Technology, Vasai is located on the sprawling campus of Vidyavardhini, spread over an area of 12.27 acres. It is a short, two minutes walk from Vasai Road (W) Railway Station. The college is also accessible by road from Mumbai.

Vidyavardhini Society received approval from AICTE to start the new college of Engineering & Technology with effect from July, 1994. The college is affiliated to the University of Mumbai for the four year degree program leading to the degree of Bachelor of Engineering in six branches.

Objective of VNC 2020 TASU

Technology has always been potential tool for simplifying the way we do things. Present time demands directing the technological advancements towards addressing societal challenges such as improving health care, education environment, sanitation, agriculture, smart city, etc., VNC 2020 TASU aims to provide an opportunity to researchers, academicians, Industrialist and students to interact and share their ideologies and contributions made for social upliftment with the aid of technological advancements.

Call for paper

We welcome submission in following area

1. Sustainable Computing
 2. High Performance Computing
 3. High Speed Networking and Information Security
 4. Software Engineering and Emerging Technologies
 5. Mathematical, Experimental, Computational and AI, IoT Techniques in Mechanical Engg.
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 11. Present practices in construction management
 12. Recent developments in Instrumentation, control and automation
 13. Embedded Systems, IoT and VLSI Design
 14. Optical and Wireless Communication for NGN
 15. Antenna and Microwave Devices
- Any other relevant topics

Publication Information

Proceedings of VNC - 2020 TASU will be published with ISBN number

1. Selected Papers will be published in International Journal of Information Technology, Published by Springer Nature, ISSN: 2511-2104 (Print Version), ISSN: 2511-2112 (Electronic Version)
2. All papers will be published in IJERT, ISSN: 2278-0181

Important Dates:

- Submission of full length paper
15th Feb 2020
- Paper Acceptance Notification
22nd Feb 2020
- Submission of Final Version of Paper
29th Feb 2020
- Registration Deadline
5th March 2020
- PPT Submission
20th March 2020
- Conference
4th April 2020

Registration Fee Details:

Category of Delegates / Authors	Indian Authors & Delegates (in INR)
Full Time Students (UG)	1,500.00
Teachers/ Research Scholars/ PG students	2,500.00
Industry	3,500.00

Paper Submission:

Paper submission should be made strictly via Easy Chair the submission link for VNC 2020 "TASU":
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Download paper template from:

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Contact Us:

Mr. Yogesh P. Pingle
Vidyavardhini's College of
Engineering & Technology
K.T. Marg, Vasai (W) - 401 202
Maharashtra, India
Contact No.: 9665009742
Email ID: vnc2020@ycet.edu.in
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***Best paper award
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ILMENITE-SULPHURIC ACID DIGESTION PRESSURE VESSEL: DESIGN AND ANALYSIS

Dr. Uday Aswalekar
Department of Mechanical Engineering
Vidyavardhini's College of Engineering and Technology
Palghar, India
uday.aswalekar@vcet.edu.in

Ms. Apurva Pendbhaje
Department of Mechanical Engineering
Vidyavardhini's College of Engineering and Technology
Palghar, India
apurva.pendbhaje@vcet.edu.in

Abstract — Pressure vessels are containers used for containment of Gases, Liquids at substantially higher pressure. This paper deals with the sizing and mechanical design of a chemical reactor used for the Digestion of Ilmenite and Sulphuric Acid. The mechanical design of the components of the Pressure vessel has been achieved using the ASME code and engineering design formula. The maximum principal stress theory has been used as the yield criteria for designing the components of the vessel. The stress variations across the length of the shell has been found using analysis in Ansys and stiffening rings of suitable dimensions have been provided to prevent buckling of the vessel. Hydrostatic pressure has been found within the allowable limit which proves that the vessel can withstand the applied pressure. The results obtained in ANSYS has been optimized by varying the element size, shape of elements and number of elements in ANSYS.

Keywords — Ilmenite- Sulphuric acid, ASME, ANSYS, Mesh sensitivity, Boundary Condition.

I. INTRODUCTION

A pressure vessel is to be designed for Ilmenite- Sulphuric acid digestion process. The process involves digestion of Ground Ilmenite with 93-98% H₂SO₄ for 3 hours. Mechanical agitation is given at the initial stage of the reaction and the mixture thickens and a dough like mass is formed. After allowing the mass to cool and on adding 4.5 cubic meters of dilute sulphuric acid having acidity of 6-7 N is added to the reacted mass. The slurry having a density of 1.5 g/cc is pumped to a settling tank and allowed to settle for about 8 hours and the clear liquor is collected.

II. PROBLEM DEFINITION

A pressure vessel is to be designed for Ilmenite- Sulphuric acid digestion process. The process involves digestion of Ground Ilmenite with 93-98 % H₂SO₄ for 3 hours. Mechanical agitation is given at the initial stage of the reaction and the mixture thickens and a dough like mass is formed. After allowing the mass to cool and on adding 4.5 cubic meters of dilute sulphuric acid having acidity of 6-7N is added to the reacted mass. The slurry having a density of 1.5 g/cc is pumped to a settling tank and allowed to settle for about 8 hours and the clear liquor is collected.

The operational requirements of Pressure vessel for Ilmenite-Sulphuric acid digestion process is

Table 1: Operational requirement of pressure vessel

Sr. No.	Parameters	Values
1	Maximum Temperature	300°C
2	Operating Pressure	1.01 bar
3	Bulk Density	1800 kg/cm ³
4	Heat Supply	Steam

III. LITERATURE REVIEW

B. S. Thakkar, S. A. Thakkar [1] conducted a series of hydrostatic tests to determine the performance of pressure vessel under pressure to examine the ability of the structure to withstand various pressures. The pressure vessel was designed using ASME codes & standards. FEA analysis was done to verify the above design procedure. This aspect of design greatly reduces the development time of new pressure vessel, allows the designer to keep free from multiple prototypes for pressure vessel before finalizing the design.

Dinesh U Parmar, Ashwin D Patel [2] developed a double walled tank of SS304 material using ANSYS. The analysis was carried out on ANSYS all the parts of storage tank where stresses were induced. The storage tank thus designed was found to be fit for use in Industries.

Qayssar Saeed Masikh, Dr. Mohammad Tariq [3] analysed thin and thick-walled pressure vessel for different material. The optimization of the thickness of pressure vessels on the basis of its thickness variation has been applied and the results obtained are verified using Maximum normal stress theory and Maximum shear stress theory.

Merlin J. Thattil, Chitaranjan Pany [4] designed a pressure vessel with different end domes (tori spherical and hemispherical) subjected to internal pressure and for a volume of 1000 litres which will be useful for space applications. The analysis has been carried out on ANSYS software to estimate the stress in dome and cylindrical shell of pressure vessel. Stresses at the junction of tori spherical head to cylindrical shell were found to be lower than hemispherical domes.

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Dept. of Mechanical Engg.
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Vasai Road-401202.

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VNC - 2020 TASU
27th June, 2020

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Certificate of Participation

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This certificate is presented to
Dr. Uday V. Aswalekar
 Vidyavardhini's College of Engineering & Technology

for presenting paper titled

ILMENTE-SULPHURIC ACID DIGESTION PRESSURE VESSEL DESIGN AND ANALYSIS

in the Vidyavardhini's National conference 2020 "Technical Advancements for Social upliftments" organized by Vidyavardhini's College of Engineering and Technology, Vashi held on 27th June 2020

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HEAD
 Dept. of Mechanical Engg
 Vidyavardhini's College of
 Engineering & Technology
 Vashi Road - 401202

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