Fabrication of continuous mode biomass gasifier reactor for thermal application

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By

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CERTIFICATE

It is to certify that this project report entitled, **"FABICATION OF CONTINUOUS MODE BIOMASS GASIFIER REACTOR FOR THERMAL APPLICATION"** is based upon the results of experiments carried out by **ALEEZA FATIMA, MUHAMMAD AZEEM ASHRAF** and **OMER MUNIR** under my supervision. No material has been used in this report which is not their own work except where due acknowledgement has been made. They have fulfilled all the requirements and qualified to submit this report for the Degree of BS-Industrial Engineering.

ADNAN AHMAD NAEEM

Assistant Professor/ Supervisor

Department of Industrial Engineering

Acknowledgment

We would first like to thanks **Almighty Allah** for empowering us to complete this project on time.

We would like to thanks our Project advisor, Sir **Adnan Ahmad Naeem** who gave endless support and dedication towards the project and giving us all of his time to complete this project and its presentation on time. Without you, we would never be able to even start the project. We are grateful and gratefully acknowledged your contribution.

We would also like to acknowledge the support of following peoples:

- We would like to acknowledge the support of our friends and relatives for supporting us in every manner.

- We would like to thank and appreciate the SEN faculty for sharing their knowledge with us. It helped us to understand how to fill the gaps of our project.

We thank you all.

ALEEZA FATIMA

MUHAMMAD AZEEM ASHRAF

OMER MUNIR

Abstract

As we were doing our final year project, our main objective is to convert agricultural-waste into a useful resource. We selected a preliminary design of continuous mode. We designed that model of gasifier on Solid Works designing software. Then we fabricate a Continuous mode Biomass Gasifier Reactor with improved thermal performance and low cost, by using local material and technology. It provideclean Fuel for thermal applications and economical energy solution for industrial and domestic purposes. The gas produced in gasifier could be used to generate electricity and also for continuous supply of gas for commercial purposes. Due to load shedding of natural gas industries have to suffer a big loss. We have used rice husk as biomass and made a special reactor fabricated from local machines and local materials in order to decrease the cost of gasifier.We have achieved high thermal efficiency from our reactor using gasification process which requires limited amount of air that has been provided by a DC fan. During experimentation phase we were facing difficulty in the process of gasification so we figure out the cause which is directly associated with the supply of air so we fabricate a tunnel for supply of sufficient air. By-product is a bio-char which can be used as a fertilizer because of enrichment of essential minerals like potassium and nitrogen and also be used for water filtration process.

PROJECT ACHIEVEMENTS

We participate in various competition and present our project at different national level competitions.

➢ 6th Invention to Innovation Summit'17

We have participated in 6th Invention to Innovation Summit'17 organized by Punjab University Lahore and from there we won "**Technology and Innovation Award**".

➢ SATHA (South Asia Triple Helix Association)

We won "**Medal& Certification from SATHA (South Asia Triple Helix Association)"** for our final year project **"Continuous Mode Biomass GasifierReactorFor Thermal Application"**.

➢ World IP Day

We also participated in **World IP Day** organized by **IPO (Intellectual property organization)** office Lahore where we are awarded by appreciation certificate on our exceptional work in our project by **Ex-Chief Justice** Mr.TassaduqHussainJillani along with the credible panel of judges.

➢ BNU Bestival'17

We participated in **BNU Bestival** in **entrepreneurial** category and receive appreciation certificate from there.

➢ GCIP'17 (Global Clean tech Innovation Program) by UNIDO

We also participated in **GCIP (Global Clean tech Innovation Program)** organized by **UNIDO** and we have qualified **semifinalist round** then they recommend us to attend National Academy for **semifinalist,** then after that now we are attending **webinars** and preparing for the final round which is about to held in October.

- **Appreciation from Director General UMT**

We qualified for the **prize money** announced by **Director General UMTMrAbidSharwani**, for qualifying **semifinalist round** of **GCIP'17** organized by **UNIDO (United Nation Industrial Development Program)**.

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CHAPTER 1: INTRODUCTION

1. INTRODUCTION

Natural gas is used as a fuel source in Pakistan. The Natural gas is used by industries for running boilers and furnaces, in urban areas and some of the rural areas where it is accessible. Sui Northern Gas Pipelines Limited (SNGPL) is the governing body to supply Natural gas all over the Pakistan but it is kept failing to do so.

Figure 1Industrial Furnace