VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI 590018

A project report on

"CHARACTERIZATION OF BISMUTH AND TIN BASED ALLOY FOR THERMAL INTERFACIAL MATERIAL APPLICATION"

Submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

By

MOHAMMED FAHAD H	**4AL20ME015**
RAKSHITH S	**4AL20ME019**
RAKESH KELAGADE	**4AL21ME402**
DODDAMALLAIAH	**4AL21ME400**

Under the Guidance of

Dr. KUMAR SWAMY M C

Assistant Professor

ALVA'S
Education Foundation®

Department of Mechanical Engineering

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

2023 – 2024

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Mijar, Moodbidri D.K. -574225 – Karnataka

ALVA'S

DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

Certified that the project work entitled "**CHARACTERIZATION OF BISMUTH AND TIN BASED ALLOY FOR THERMAL INTERFACIAL MATERIAL APPLICATION**" is a bonafide work carried out by

MOHAMMED FAHAD H	**4AL20ME015**
RAKSHITH S	**4AL20ME019**
RAKESH KELAGADE	**4AL21ME402**
DODDAMALLAIAH	**4AL21ME400**

are bonafide student of Mechanical Engineering, Alva's Institute of Engineering and Technology in partial fulfillment for the award of **BACHELOR OF ENGINEERING** in **MECHANICAL ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2023–2024. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

M.C.K 18/5/24

Dr. Kumar Swamy M C
Project guide

Dr. Satyanarayan
Head of the Department
Dept. Of Mechanical Engineering
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

Dr. Peter Fernandes
Principal
PRINCIPAL
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225, D.K

External Viva

Name of the Examiners	Signature with Date
1. Deepak Kothari	D R Kothari 28/5/24
2. Dr. Mohan Kumar	28/5/24

ABSTRACT

The demand for efficient thermal management in electronic devices has spurred significant interest in novel materials for thermal interfacial applications. Bismuth and tin based alloys offer promising characteristics such as low melting points, high thermal conductivity, and compatibility with various substrates, making them attractive candidates for thermal interface materials (TIMs). This study focuses on the comprehensive characterization of bismuth and tin based alloys, including their thermal properties, microstructure, phase transitions, and mechanical behaviour. Various alloy compositions are investigated to optimize thermal performance while maintaining mechanical integrity. Experimental techniques such as different Microstructure X-ray diffraction (XRD) are employed to elucidate the thermal and structural properties of the alloys. The findings contribute to the understanding of bismuth and tin based alloys as viable candidates for advanced thermal management solutions in electronic devices.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI 590018

A project report on

"DESIGN AND FABRICATION OF AUTOMATED HUMIDITY CONTROLED SOLAR PEPPER DRYER"

Submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

By

ADWITH KUMAR	**4AL20ME001**
MOHAMMED SWAHID	**4AL20ME014**
VARUN S	**4AL20ME021**
VIGNESH	**4AL20ME022**

Under the Guidance of

PROF. VIRENDRA KUMAR KAMBOLI &

PROF.SHARTHCHANDAR PRABHU

Assistant Professor

ALVA'S

Education Foundation®

Department of Mechanical Engineering

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

2023 – 2024

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Mijar, Moodbidri D.K. -574225 – Karnataka

ALVA'S
Education Foundation®

DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

Certified that the project work entitled "**DESIGN AND FABRICATION OF AUTOMATED HUMIDITY CONTROLED SOLAR PEPPER DRYER**" is a bonafide work carried out by

ADWITH KUMAR	--	**4AL20ME001**
MOHAMMED SWAHID		**4AL20ME014**
VARUN S		**4AL20ME021**
VIGNESH		**4AL20ME022**

are bonafide student of Mechanical Engineering, Alva's Institute of Engineering and Technology in partial fulfillment for the award of **BACHELOR OF ENGINEERING** in **MECHANICAL ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2023–2024. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

Prof. Virendra Kumar Kamboli &
Prof. Sharathchandra Prabhu

Project guide

Dr. Satyanarayan
Head of the Department

H.O.D.
Dept. Of Mechanical Engineering
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

Dr. Peter Fernandes
Principal

PRINCIPAL
Alva's Institute of Engg. & Technology,
Mijar, MOODBIDRI - 574 225, D.K

External Viva

Name of the Examiners	**Signature with Date**
1. Deepak Kothari	D.K. Kothari 28/5/24
2. Dr. Mohan Kumar	28/5/24

ABSTRACT

The design and fabrication of an agricultural produce solar dryer for the drying of chili pepper. The solar dryer consists of a solar absorption chamber and a drying chamber. The solar absorption chamber has an opening for the inlet of air, a dark-walled enclosure, and a dark corrugated metal sheet. The drying chamber has tray racks on which two trays are placed, a door for easy access to the trays, their placement, and removal, a transparent glass roof, a circulation fan. An STC3028 humidity and temperature controller is connected to the drying chamber to measure its humidity and temperature. Connected to the controller is a fan that spins to control the humidity when it exceeds the set point (RH of 50%). The system runs on solar power Original Research Article its operation is initiated and halted by an electric switch. Two experiments were carried out with the same mass samples to analyze the performance of the solar dryer as compared to open sun drying. The drying rate, drying time, and efficiency of drying in the solar dryer and the open sun were compared and the results showed a higher drying rate of 11.73g/h on average and a shorter drying time of 27 hours for drying in the solar dryer for each experiment. Drying the chili pepper in the sun took 36 hours for each experiment and it happened at a rate of 8.83g/h and 8.78g/h, respectively. The average efficiency of the dryer is 32.34%.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI 590018

A project report on

"DESIGN AND FABRICATION OF SOLAR POWERED MANUAL CUTTING DEVICE FOR HARVESTING TEA LEAVES"

Submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

By

JENNY FERNANDES	4AL20ME011
NAVYASHREE H B	4AL20ME016
PALLAVI P	4AL20ME017
SANDEEP JARALE	4AL21ME404

Under the Guidance of

Prof. Deepak Kothari

Assistant Professor

ALVA'S

Education Foundation®

Department of Mechanical Engineering

ALVAS INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

2023 – 2024

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Mijar, Moodbidri D.K. -574225 – Karnataka

ALVA'S
Education Foundation®

DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

Certified that the project work entitled **"DESIGN AND FABRICATION OF SOLAR POWERED MANUAL CUTTING DEVICE FOR HARVESTING TEA LEAVES"** is a bona fide work carried out by

JENNY FERNANDES	**4AL20ME011**
NAVYASHREE H B	**4AL20ME016**
PALLAVI P	**4AL20ME017**
SANDEEP JARALE	**4AL21ME404**

are bonafide student of Mechanical Engineering Alva's Institute of Engineering and Technology in partial fulfillment for the award of BACHELOR OF ENGINEERING in **MECHANICAL ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2023–2024. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

D.R.Kothari

Prof. Deepak Kothari
Project Guide

Dr. Satyanarayan
Head of the Department
Dept. of Mechanical Engineering
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

Dr. Peter Fernandes
Principal
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225, D.K

External Viva

Name of the Examiners	**Signature with Date**
1. Deepak Kothari	D.R.Kothari 28/5/24
2. Dr. Mohan Kumar	28/5/24

ABSTRACT

Our project is focused on the construction and design of the solar tea leaf cutting apparatus. These locations are great places to get tea because it is possible to grow tea leaves there. Tea leaves are often chopped by hand using a larger workforce. In addition to being labor-intensive, this takes a long time. The consistency of the tea that is made could be affected because the leaves are not cut into equal pieces. We suggest a basic solar tea leaf cutting device to get rid of these kinds of drawbacks. Our device is lightweight and manageable to carry with just the hands. Our automated procedure allows for faster leaf cutting and eliminates the requirement for an external power source for operation. The device has a blower on the side to help loosen leaves that have become stuck in its teeth. The entire system is powered by the backpack-mounted solar panel, which transforms solar energy into electricity. Project components were designed and constructed using Solid Works software, and then they were manufactured.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI 590018

A project report on

STUDY ON EFFECT OF METALLIC MOULD GEOMETRY ON SOLIDIFICATION BEHAVIORS OF Sn-Cu ALLOYS

Submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

By

CHIRANTH H S	**4AL20ME006**
PAVAN KUMAR H R	**4AL20ME018**
MANOJ KUMAR KARNAM	**4AL20ME012**
SACHIN RATHOD	**4AL21ME403**

Under the Guidance of

Dr. Satyanarayan

Professor and Head, Dept, Mechanical Engineering

ALVA'S
Education Foundation®

Department of Mechanical Engineering

ALVAS INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

2023 – 2024

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Mijar, Moodbidri D.K. -574225 – Karnataka

ALVA'S
Education Foundation®

DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

Certified that the project work entitled **"STUDY ON EFFECT OF METALLIC MOULD GEOMETRY ON SOLIDIFICATION BEHAVIORS OF Sn-Cu ALLOYS"** is a bonafide work carried out by

CHIRANTH H S	**4AL20ME006**
PAVAN KUMAR H R	**4AL20ME018**
MANOJ KUMAR KARNAM	**4AL20ME012**
SACHIN RATHOD	**4AL21ME403**

are bonafide student of Mechanical Department Alva's Institute of Engineering and Technology in partial fulfillment for the award of BACHELOR OF ENGINEERING in **MECHANICAL ENGINENRING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2023–2024. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

Dr. Satyanarayan **Project Guide**	**Dr. Satyanarayan** **Head of the Department** Dept. of Mechanical Engineering Alva's Institute of Engg. & Technology Mijar, MOODBIDRI - 574 225	**Dr. Peter Fernandes** **Principal** PRINCIPAL Alva's Institute of Engg. & Technology, Mijar, MOODBIDRI - 574 225, D.K

External Viva

Name of the Examiners	**Signature with Date**
1. Deepak Kothari	D. R. Kothari 28/5/24
2. Dr. Mohan Kumar	28/5/24

ABSTRACT

In order to improve the mechanical properties of alloys there are various parameters to be considered such as alloying element, cooling media, melting temperature, mould temperature, cooling rate, geometry of moulds, type of casting mould etc. Among this mould material and their geometry are considered as important parameters. In this regard, in the present investigation liquid Sn-Cu alloy melted from 700°C was allowed to solidify in pure Al and Cu metallic mould geometry of square and hexagonal shapes. The further solidified alloy was subjected to determine the mechanical property (RHN) from one end of the corner to another end of the corner of the casted alloy (diagonally). It was observed that alloy cast in the square mould of Cu exhibited the highest hardness, whereas alloy solidified in the hexagonal mould of Al geometry exhibited the highest hardness. In overall, alloy solidified in hexagonal mould showed higher hardness than alloy solidified in a square mould. Thermal mapping simulation studies were carried out using Fusion 360 software. Results indicated that hexagonal moulds having more corners exhibited higher thermal stress and heat flux than alloy solidified in square moulds.

Keywords: Sn-Cu, Alloy, Mould Geometry, Solidification, Microstructure, Harness, Heat flux

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"Jnana Sangama" Belagavi -590018

A project report on

"DESIGN AND FABRICATION OF REMOTE-CONTROLLED PESTICIDE SPRAYER MACHINE"

Submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

By

BABUGOUDA SHANKARAGOUDA	4AL20ME003
GIRISH B BANNIKOPPA	4AL20ME009
MANU K N	4AL20ME013
RAHUL KUMBAR	4AL21ME401

Under the Guidance of

MR. PRAVEEN K C

Assistant Professor

Department of Mechanical Engineering

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

2023 – 2024

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

Mijar, Moodbidri D.K. -574225 – Karnataka

ALVA'S
Education Foundation®

DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

Certified that the project work entitled "**DESIGN AND FABRICATION OF REMOTE-CONTROLLED PESTICIDE SPRAYER MACHINE**" is a bona fide work carried out by

BABUGOUDA SHANKARAGOUDA	**4AL20ME003**
GIRISH B BANNIKOPPA	**4AL20ME009**
MANU K N	**4AL20ME013**
RAHUL KUMBAR	**4AL21ME401**

are bonafide student of Mechanical Engineering Alva's Institute of Engineering and Technology in partial fulfillment for the award of **BACHELOR OF ENGINEERING** in **MECHANICAL ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year **2023–2024.** It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

Signature of the Project Guide	**Signature of the HOD**	**Signature of the Principal**
Mr. Praveen K C	**Dr. Satyanarayan**	**Dr. Peter Fernandes**
	Dept. Of Mechanical Engineering Alva's Institute of Engg. & Technology Mijar, MOODBIDRI - 574 225	Alva's Institute of Engg. & Technology, Mijar, MOODBIDRI - 574 225, D.K

EXTERNAL VIVA

Name of the Examiners	**Signature with Date**
1. Deepak Kothari	D. R. Kothari 28/5/24
2. Dr. Mohan Kamer	28/5/24

ABSTRACT

The population of India is growing quickly, and more food needs to be produced in order to feed everyone. However, this needs to be within everyone's budget. India still practices traditional farming methods (small, medium Farmers), although the country's industrial and service sectors have grown more rapidly than its agricultural sector. A certain amount of equipment has been produced to help mechanize agriculture in India. Among them is the pesticide sprayer, which is used by conventional farm laborers either with an electric pump or by carrying a backpack-style sprayer that involves physical labor. In order to enhance the agricultural system and lessen the strain on farmers and the issues related to backpack sprayers and also health issues, new equipment is being developed. The system integrates advanced technologies such as IoT (Internet of Things), and automation.

The remote-controlled pesticide Sprayer machine is equipped with a user-friendly interface that allows farmers to remotely manage and monitor the system from their smartphones. The machine employs Bluetooth technology Through this innovative approach, it minimizes overuse of pesticides and water, reducing environmental impact and operational costs.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI 590018

A project report on

"DESIGN AND FABRICATION OF LIFTING EQUIPMENT FOR PHYSICALLY DISABLED PERSONS"

Submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

By

AKSHAR N	**4AL20ME002**
CHANDAN BHOSALE	**4AL20ME004**
DILEEP P R	**4AL20ME007**
FRISON NIKHIL MARTIS	**4AL20ME008**

Under the Guidance of

PROF. PRAMOD KUMAR N

Assistant Professor

ALVA'S
Education Foundation®

Department of Mechanical Engineering

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

2023 – 2024

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Mijar, Moodbidri D.K. -574225 – Karnataka

ALVA'S
Education Foundation

DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

Certified that the project work entitled **"DESIGN AND FABRICATION OF LIFTING EQUIPMENT FOR PHYSICALLY DISABLED PERSONS"** is a bonafide work carried out by

AKSHAR N	**4AL20ME002**
CHANDAN BHOSALE	**4AL20ME004**
DILEEP P R	**4AL20ME007**
FRISON NIKHIL MARTIS	**4AL20ME008**

are bonafide student of Mechanical Engineering, Alva's Institute of Engineering and Technology in partial fulfillment for the award of **BACHELOR OF ENGINEERING** in **MECHANICAL ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2023–2024. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

13/5/24

Prof. Pramod kumar N
Project guide

Dr. Satyanarayan
Head of the Department
Mijar, MOODBIDRI
External Viva

Dr. Peter Fernandes .
Principal
PRINCIPAL
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

Name of the Examiners

1. Deepak Kothari
2. Dr. Mohan Kumar

Signature with Date

D.R Kothari
28/5/24

ABSTRACT

This equipment plays a critical role in improving the quality of life and independence for individuals with paralysis. The numerous engineering breakthroughs, knowledge areas, and future opportunities in this sector. These considerations are critical for building lifting equipment that is safe, efficient, and user-friendly while meeting the unique demands of people with paralysis. Automation in disability lifting equipment has various benefits, including increased safety, independence, and a better user experience. Looking ahead, this field's future holds promising opportunities for advancements in mobility solutions, neuro technology integration, personalized designs, and smart, connected systems, all of which contribute to a more accessible, efficient, and sustainable approach to lifting and transferring people with paralysis. Continued research and collaboration are critical to driving future innovation and ensuring the global development of paraplegic lifting equipment. Its intended use is for paralysis patients at hospital and house. For the user's quality of work life is improved while for the factory, there will be reduction of the work-related pain of the patient. It is meant to reduce worker fatigue and work-related accidents while improving productivity. It can be customized to fit all sizes and outfits. For the hospital, space management is an important factor. Unnecessary chairs and resting places can be avoided by maximizing the use of this equipment. This device is used to shift the patient from one place to another with comfort and less effort.