
R&D Report

2008-11



St. PETER's UNIVERSITY
St. PETER'S INSTITUTE OF HIGHER EDUCATION AND
RESEARCH

(Declared under Section 3 of the UGC Act, 1956)

Avadi, Chennai 600054, Tamil Nadu

www.stpetersuniversity.org

January 2011

Temperature and Pressure Effect of Two-Phase Flow across Control Valve and Pipe in Series

Department: Electronics and Instrumentation Engineering

Sponsored by: Department of Science & Technology

Amount : Rs. 12.00 Lakhs

Duration : 2007-2010

Project Team: Prof.Dr. R. Rani Hemamalini

Objectives:

Gas-liquid flow is the most complex of the two-phase flows because of existence of deformable interfaces and the fact that one of the phases is compressible. A very wide range of interfacial configurations is possible in such two-phase flow. It is possible to simplify the treatment of gas-liquid flow by classifying the type of distribution into a number of flow patterns or flow regimes. Although equipment such as long -tube evaporators, reboilers and tubular steam generators has been used for many years, relatively little analysis of the vaporization or heating process has been made. The boiling of liquids in vertical tubes is the most important application of two- phase heat transfer, and will now be considered.

Two-phase flow, the simultaneous flow of a liquid and a gas, occurs in many chemical and petroleum engineering processes, as well as in nature. Fluid flow takes place across the pipes as well as valves, in various stages of processes in the processing industries. When compared with multiphase flow through valves, the flow through pipes is well developed. Hence this research is very important for the industries that are all involved in the process of two-phase flow applications.

Methodology:

The heat transfer and pressure drop characteristics have to be experimentally investigated for two-phase flow across horizontal pipe and control valve in series at the atmospheric conditions. The heat transfer and pressure drop across the pipeline and valve as a function of the flow rate (valve position) is proposed to be studied in depth.

There are a number of factors to be considered with respect to the nature of the fluids, flow patterns, phase distribution, flow conditions, and fluid properties in order to build the mathematical relationship (model). Also, there is virtually no experimental information available for the proper discharge coefficient to use for two-phase flows.

Two-phase flow in horizontal pipe and control valve in series has to be experimentally studied. It is proposed to establish relationship based on the experimental measurement and analysis. The effect on heat transfer between the pipe section and the valve section is planned to be included in this research.

Publication:

Rani Hemamalini, Arivazhagan, and Sundaram.S, "Experimental and computational study of two-phase (air – palm oil) flow through pipe and control valve in series", International Journal of Sensors and Transducers, Vol 102, No. 3, March 2009, pp.94-104.

An Expert System based Systematic Heat Transfer Measurement for Multiphase Flow

Department: Electronics and Instrumentation Engineering

Sponsored by : All India Council for Technical Education

Project cost : Rs.6.75 Lakhs

Duration : 2007-2009

Project Team : Prof.Dr. R.Rani Hemamalini and Mr.M. Suresh

Objectives:

The objectives of this study is to extend the knowledge base by gathering quality non-boiling, two-phase, two-component heat transfer data in the horizontal and inclined positions, and also through control valves with various flow patterns, and analyze their behavior in order to develop a general overall heat transfer coefficient correlation for multiphase flow regardless of flow orientation.

Progress made so far :

Gas-liquid two-phase flow in pipes is commonly observed in many industrial applications, and its hydrodynamic and thermal conditions are dependent upon the interaction between the two phases. The purpose of this study is to further develop the knowledge and understanding of heat transfer in non-boiling two-phase, two-component flow. The equipment required for the study has been procured. Air-water flow heat transfer experiments are conducted in a circular pipe in the horizontal and slightly upward inclined positions at 2°, 5°, and 7° under uniform wall heat flux boundary condition.

Expert System based Process Simulation Lab

Department: Electronics and Instrumentation Engineering

Sponsored by: All India Council for Technical Education - MODROBS

Project cost : Rs.8.00 Lakhs

Duration : 2007-2009

Project Team: Prof.Dr. R.Rani Hemamalini

Progress:

The equipment for two phase flow studies on pipes has been procured, installed and commisiioned. Experiments were conducted using this set up.



Experimental set up for two-phase flow studies across control valve and pipe in series

Production of Peptide Antibiotics from Buffalo Milk Whey Protein

Department: Biotechnology

Sponsoring agency : Tamilnadu State Council for Science and Technology

Total Budget : Rs.1.35 lakhs

Duration : April 2008 to April 2010

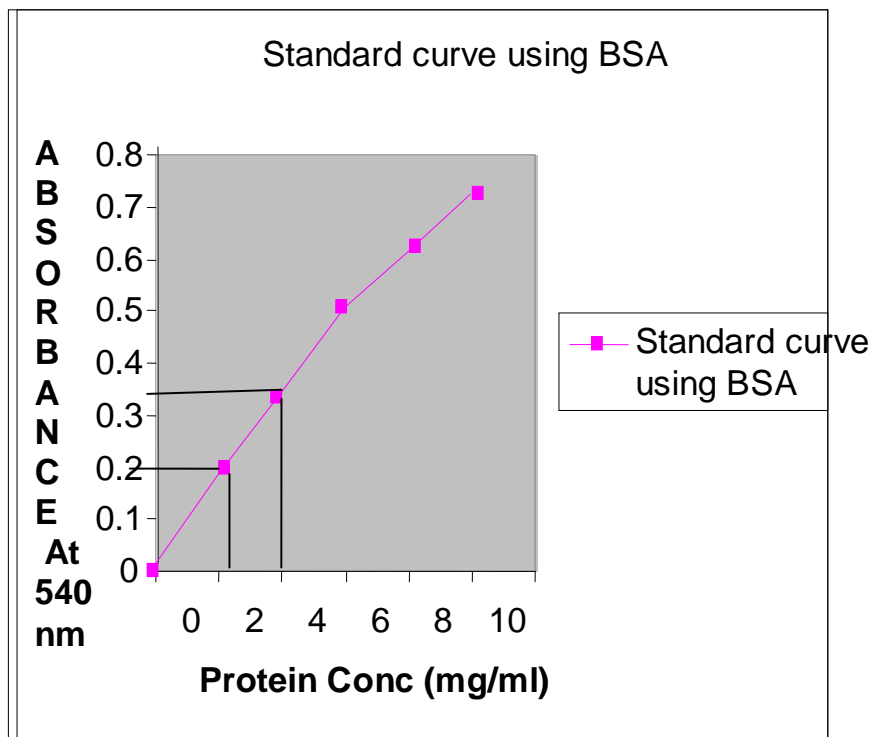
Principal Investigator: Prof.Dr.S.Meignanalakshmi

Progress made so far:

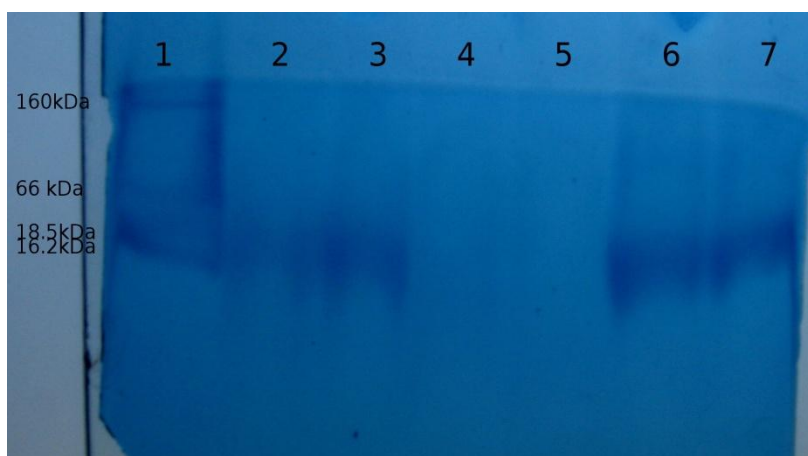
- Milk samples were collected from Murrah buffaloes at kattupakkam Livestock Research Station,
- Whey protein has been separated and estimated by Biuret method.
- Whey protein has been subjected for enzyme digestion with pepsin, Papain, Trysin and Chymotrypsin and digested samples are confirmed for digestion by using Sodium Dodecyl Sulphate – Poly Acrylamide Gel Electrophoresis (SDS-PAGE).
- Whole digest is tested for antibacterial activity

Future Programme:

Digested products will be analysed by High Performance Liquid Chromatography (HPLC) and will be sequenced

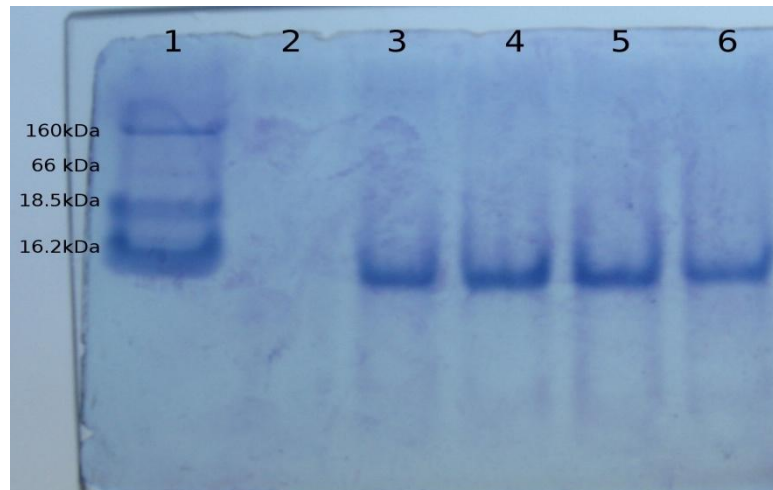


Estimation of Whey Protein Using Biuret Method



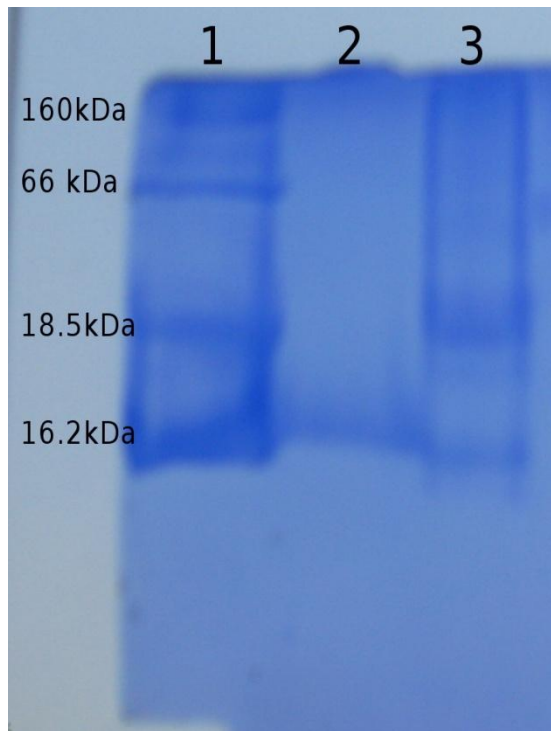
Lane 1: Native protein heated; Lane 2: 4 hours trypsin digest sample with heat-pretreatment; Lane 3: 4 hours trypsin digest sample without heat-pretreatment; Lane 4: 4 hours chymotrypsin digest sample without heat-pretreatment; Lane 5: 4 hours chymotrypsin digest sample with heat-pretreatment; Lane 6: 4 hours papain digest sample without heat-pretreatment; Lane 7: 4 hours papain digest sample with heat-pretreatment

SDS-PAGE Analysis of Trypsin, Chymotrypsin and Papain Digested Whey protein Samples at different conditions



Lane 1: Native protein – unheated; Lane 2: -no sample;
 Lane 3: 2 hours digest sample without heat-pretreatment at 37°C incubation;
 Lane 4: 4 hours digest sample without heat-pretreatment at 37°C incubation;
 Lane 5: 4 hours digest sample without heat-pretreatment at 48°C incubation;
 Lane 6: 4 hours digest sample with heat-pretreatment at 37°C

SDS-PAGE Analysis of Pepsin Digested Whey protein samples at various conditions

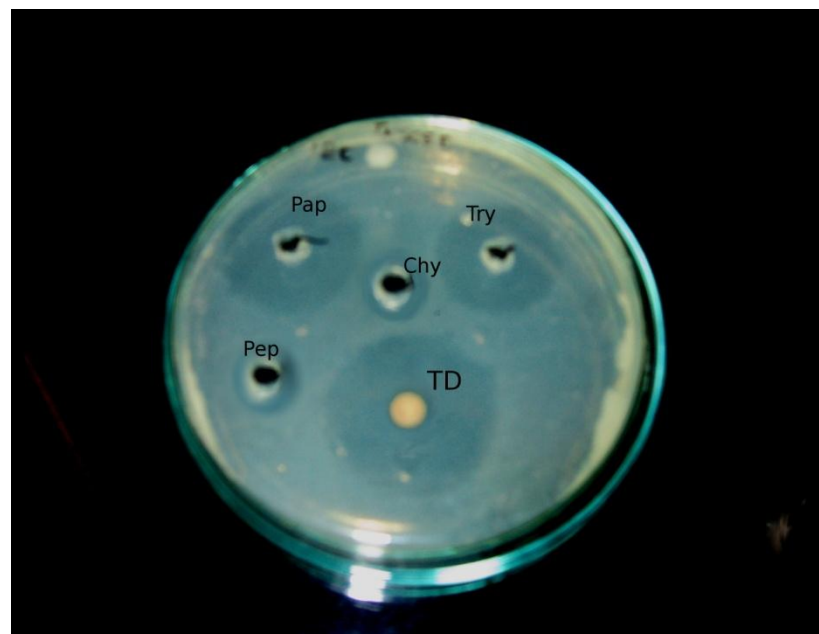


Lane 1: Native protein unheated

Lane 2: 3 hours pepsin digest sample with heat-pretreatment

Lane 3: 3 hours papain digest sample with heat-pretreatment

SDS-PAGE Analysis of Pepsin and Papain Digested whey protein samples



Try – Trypsin Digest

Chy – Chymotrypsin Digest

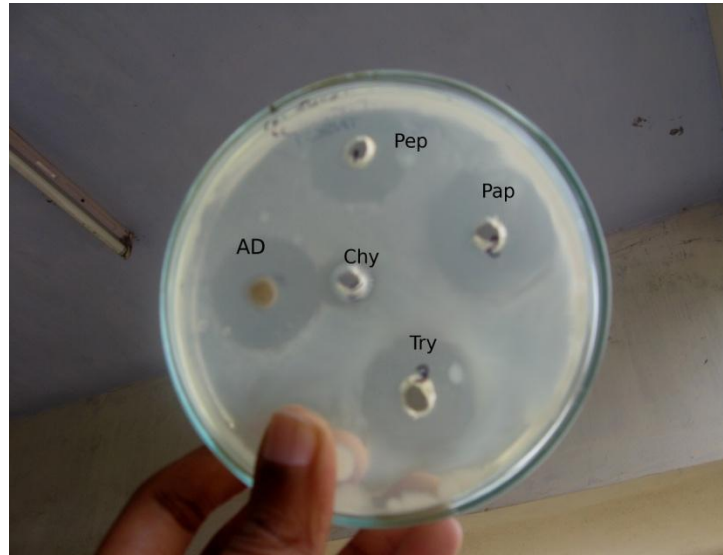
Pep – Pepsin Digest

Pap – Papain Digest

TD – standard Tetracycline Disc

Anti-bacterial activity of Enzyme Hydrolysates of

Whey protein against *E.coli*



Try – Trypsin Digest Chy – Chymotrypsin Digest
Pep – Pepsin Digest Pap – Papain Digest
AD – standard Antibiotic Disc (Tetracycline)

Anti-bacterial activity of Enzyme Hydrolysates of Whey protein against *V.cholerae*

Novel Peptide Antibiotics and Anticancer Peptides Production from Mung Bean

Department : Biotechnology

Sponsoring agency : All India Council for Technical Education

Total Budget : Rs.10.50 lakhs

Duration : February 2009 to February 2012

Principal Investigator : Prof.Dr.S.Meignanalakshmi

Progress made so far : Literature study is under progress

Experimental Studies on Two-Phase Flow in 1-2 Shell and Tube Heat Exchanger

Department: Chemical Engineering

Sponsor : All India Council for Technical Education

Cost : Rs. 10.50 lakh

Duration : March 2008 to February 2011

Convener : Prof. Dr. A. M. Saravanan

Objectives of the project :

- To study the heat transfer characteristics of two-phase flow in Distillation column
- To determine the two-phase parameters such as Lockhart-Martinelli parameter, quality and multiphase multiplier.
- To identify the flow pattern using a Fuzzy methodology
- To develop a dimensionless correlation between two-phase multiplier and Lockhart-Martinelli parameter.
- To predict two-phase heat transfer coefficient based on pure component heat transfer correlation with Reynolds number.

Status of the project:

Heat exchanger has been designed and work is under progress.

Special Purpose Machine for Multi- angle and Multi-Diameter Bending of Pipes

Department: Production Engineering

Project Leader : Mr.Ravishankar

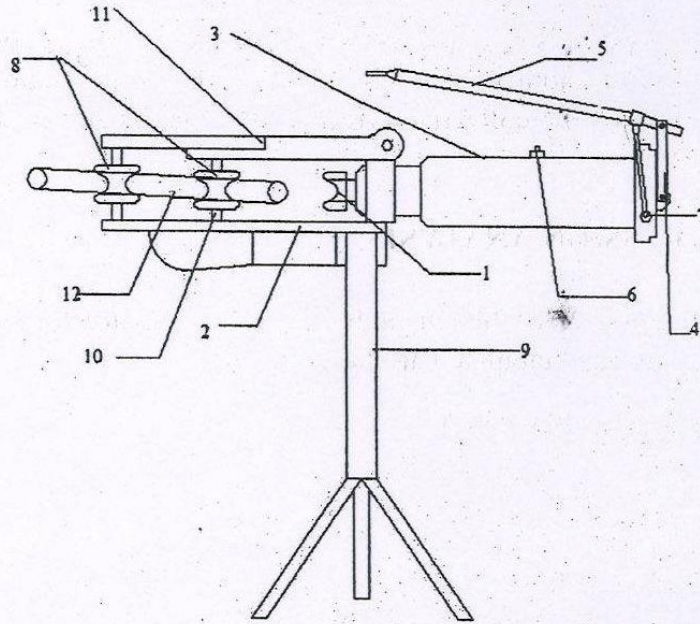
Duration: July 2007 to April 2008

The special purpose multi-angle and multi-diameter pipe bending machine is simple and easy for handling. It can be used to bend and remove the bend in pipes of different diameters. The constructional details of the machine are shown in Figure. The design of the machine has been completed.

Publication:

- Ravishankar P., "Special purpose machine for multi-angle multi-directional bending of pipes", Industrial Engineering Journal, Vol.36, No.8, August 2007, pp.28-31.

Special Purpose Machine for Multiangle and Multidiameter Bending of Pipes



Parts of the machine

- | | |
|-----------------------|-----------------|
| 1. Bending Die | 2. Bottom Plate |
| 3. Cylinder | 4. Connector |
| 5. Handle | 6. Relief Valve |
| 7. Hexagonal lock nut | 8. Roller Wheel |
| 9. Stand | 10. Shaft |
| 11. Top Plate | 12. Work Piece |

Design of Multipurpose Fixture and Pneumatic System for Engine Assembly

Department: Production Engineering

Project Leader: Mr. Ravishankar

Duration : June 2007 to April 2008

Objective:

The scope of the project is to design a multipurpose fixture that unites all the Features needed in the assembly of an engine and to improvise a new material handling system for the same. The purpose is to overcome all odds present in the current system so as to make better use of the available resources. The existing method of material handling is done separately in various conveyors and using additional labour and resource in

assisting them. The total expense incurred in the existing method can be brought down considerably.

Safety on Automobiles and Uninterrupted Driving

Department: Production Engineering

Project Leader : Mr.Ravishankar

Duration : June 2007 to April 2008

The scope of the project is to reduce the rate of accidents on automobiles in a most innovative way especially during night times. In day to day life most of the accidents occur only due to high focus of head lights. This problem can be reduced by using a light dependent resistor (LDR) sensor. Secondly most of the people fail to switch off their vehicles head light during day time. The head light can also be automatically switched off by LDR and solar Energy. Finally indication to driver is made when the temperature of a radiator is increased above a certain level. This helps the driver to halt the vehicle and take necessary action for uninterrupted driving.

Development of Advanced Surveying and Mapping Lab

Department: Civil Engineering

Sponsor: All India Council for Technical Education - MODROBS

Project cost: Rs. 10.50 Lakhs

Duration: 2008

Project Leader: Dr.P.Partheeban

Objectives:

- To establish an advanced Surveying and Mapping laboratory to carry out research on GIS applications for sustainable development.

Progress:

The following equipments were procured and commissioned.

- Trimble M3 Total Station
- Trimble GeoXT Mapping GPS
- ArcGIS Software
- HP Plotter
- HP Printer

Development of Wireless Based GIS for Air Quality Monitoring

Department: Civil Engineering

Sponsor : The Institution of Engineers (India)

Project cost: Rs.0.40 lakhs

Duration : 2008

Objectives :

- To apply a suitable gas sensing device coupled to a personal digital assistant for continuous monitoring of vehicular air pollution and disseminate the information in real time through wireless GIS.
- To build up a simple monitoring system using low cost portable gas sensing systems.
- To assist in establishing priorities, measurements of vehicular air pollution in Chennai and increasing public awareness and enhanced public participation.

Progress:

The required equipment has been procured. Work has been completed and report submitted to sponsor.

Characterisation of Flyash based Geopolymer concrete

Department : Civil Engineering

Sponsor : The Institution of Engineers (India)

Project cost : Rs.0.40 lakhs

Duration : August 2008 – July 2009

Project Leader: Dr.D.S.Ramachandra Murthy

Objective:

- To study the various mechanical properties of flyash based Geopolymer concrete.

Progress made:

Various materials required for the experiments were procured. Literature review was completed. Four types of Geopolymer concrete mixes were prepared and specimens were cast for evaluating the compressive, tensile and flexural strengths of Geopolymer concrete. The specimens were cured at room temperature as well as at 60°C for 24 hours, and tested after 7 and 28 days. The results were analysed. and technical report was prepared.

Publication:

- Ramachandra Murthy D.S., and Partheeban P., “Studies on Geopolymer concrete”, Sixth Structural Engineering Convention (SEC–2008), Chennai, December 18-20, 2008, pp.1159-1168.
- “Characterization Of Fly Ash Based Geopolymer Concrete”, Project Report submitted to The Institution Of Engineers (India), Kolkatta, May 2009.



Curing of Geopolymer concrete specimens in the oven

Development of a Prefab System using Ferrocement for Housing

Department : Civil Engineering

Sponsor : Tamil Nadu State Council for Science and Technology

Duration : August 2008 – April 2009

Project Leader : Dr.D.S.Ramachandra Murthy

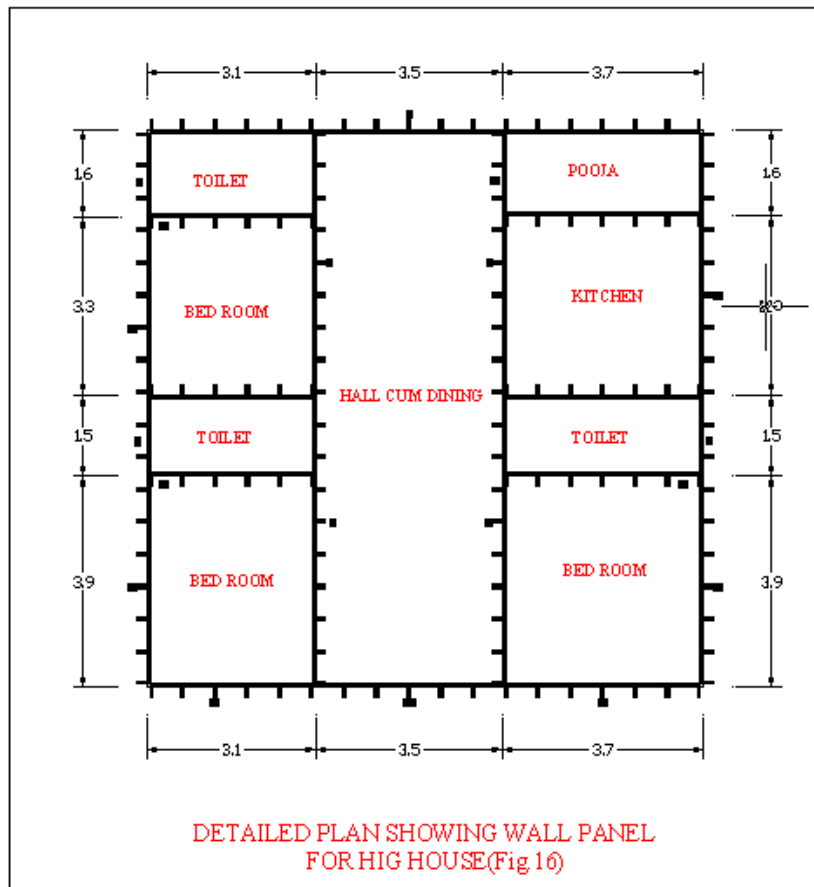
Objective :

- To develop a prefabrication system for housing using precast ferrocement panels for walls and roof.

Work done :

Modular plans were developed for three types of single storeyed houses. Precast ferrocement wall and roof panels were designed. Typical wall and roof panels were cast. Roof panels were tested for uniformly distributed load and ultimate load capacity was obtained. Compressive strength of cement mortar was obtained by testing cube specimens. Ferrocement plate specimens were

cast and tested for flexural and tensile strengths. Project has been completed. A model was made depicting the various precast elements.



Model of a Prefab House

Investigations on Fly based Geopolymer Concrete

Department: Civil Engineering

Project Team: Dr. D.S.Ramachandra Murthy

Dr.P.Partheeban, HOD (Civil) till 2009

Dr.K.Jagadeesan, HOD (Civil) from 2010

Duration : 2008 -2012

Objectives :

- To study the various properties of fly ash based Geopolymer Concrete.
- To study the various aspects relating to mix proportioning of Geopolymer concrete and suggest suitable mix design methodology.
- To study the properties of Geopolymer concrete blocks for use in building construction
- To study the behavior of Geopolymer concrete beams under static loading.
- To study the environmental effects on Geopolymer concrete

Work done:

Concrete is widely used as a construction material. An important ingredient in the conventional concrete is the Portland cement. The production of one tonne of cement emits approximately one tonne of carbon dioxide to the atmosphere. Moreover, cement production is highly energy-intensive. Many concrete structures have undergone deterioration due to environmental effects like corrosion, chemical attack etc. On the other hand, we have huge volumes of fly ash which are generated around the world. The fly ash is not effectively used and a large part of it is disposed in landfills. The volume of fly ash is also likely to increase with more power plants coming up.

Both the above nationally important issues can be addressed by using low-calcium fly ash-based Geopolymer concrete. Geopolymer concrete uses 100% replacement of cement with fly ash, with an activating chemical for binding action. Preliminary research in other countries and in India has shown that good mechanical properties can be achieved with Geopolymer concrete which are comparable to conventional cement concrete. Hence studies have been taken up for studying the various aspects of production and use of Geopolymer concrete with the above mentioned objectives.

The effects of mix proportioning and curing on compressive strength of Geopolymer concrete was studied using NaOH and sodium silicate as alkaline solution. Four types

of mixes were studied. Cubes were tested and compressive strength of concrete was obtained for the various mix proportions and curing temperatures. There is increase in compressive strength of concrete due to increase in molarity of alkaline solution and due to increase in curing temperature. The later is found to be more significant. A technical paper was prepared and presented in Structural Engineering Convention held in December 2008. Other mechanical properties of Geopolymer concrete like flexural and split tensile strengths were also studied. Solid and hollow blocks were cast and tested using Geopolymer concrete.

A project proposal was sent to Department of Science and Technology, Govt. of India. Two presentations were made at the review meetings conducted by DST. Sanction of the project and release of fund is awaited. Another project proposal on “Environmental effects on Geopolymer concrete” was submitted to Tamil Nadu State Council for Science and Technology. An entrepreneur was identified for commercial application of Geopolymer concrete blocks and the Govt. of India has approved and sanctioned a grant for technology transfer for Geopolymer concrete blocks under the MSME scheme.

Publications:

1. Ramachandra Murthy D.S., and Partheeban P., “Studies on Geopolymer concrete”, Proceedings of Sixth Structural Engineering Convention (SEC–2008), 18-20 Dec. 2008, Chennai, pp.1159-1168.
2. “Characterisation of fly ash based Geopolymer concrete”, Technical report submitted to The Institution of Engineers (India), May 2009.

Website Construction, Designing and Maintenance

Department : Computer Applications

Sponsor : Catalyst Trust, Chennai

Team: Prof. Lata Ramasamy

The screenshot shows a web browser window displaying the website for The Catalyst Trust. The browser's address bar shows the URL <http://thecatalysttrust.org/>. The website's header features a banner with the Tamil text "உந்துநர் அறக்கட்டளை" and the English text "The Catalyst Trust". Below the banner is a navigation menu with links for Home, Administration, About us, Publications, Citizens Centres, Voters Awareness, Gallery, and Contact. A quote by Bill Cosby is displayed: "I don't know the key to success, but the key to failure is trying to please everybody - (Bill Cosby)". The main content area is divided into three sections: a sidebar with the organization's logo and name, a central "Objectives" section, and a right-hand "Events" section. The "Objectives" section lists four goals, and the "Events" section reports on a state-level meeting and a trustee's passing.

Objectives

The Catalyst Trust was formed in Chennai in 1997 to further good governance through research, education, fieldwork, etc., and any other object of public utility but not involving any activity for profit. It is non political and non-sectarian, and seeks to focus on issues of

- To endeavour to achieve and consolidate the commanding position of the public In general, in the system of governance of the state.
- To create non governmental institution and forum through which the grievances of the public would be addressed to the government and redress obtained
- To make all efforts to protect and promote public interest and satisfaction and make the public aware of their rights and strengths through education, seminars, and training programmes.
- To work with government and with all elected representatives to evolve solutions to the various civic, economics, culture and social. Problems faced members of the public or any

Events

State level citizen centres coordinator's meet on 25.07.2010 grand success - [Report](#)

First year homage meeting to Sri. A.K.Venkat Subramaniam - [Click Photos](#)

TRUSTEE MR. R. SWAMINATHAN EXPIRED ON DECEMBER 7TH NIGHT AT NEW DELHI.

Website Construction, Designing and Maintenance for St. Peter's University

Department : Computer Applications

Team: Prof. Lata Ramasamy

The screenshot shows a web browser window displaying the homepage of St. Peter's University. The browser's address bar shows the URL <http://www.stpetersuniversity.org/>. The website header features the university's logo on the left, the name "St. PETER'S UNIVERSITY" in large blue letters, and the tagline "Virtual Tour" on the right. Below the header, there is a search bar and a navigation menu with links for Home, Contact, and Site Map. The main content area is divided into two columns. The left column contains a large photograph of the university's main building, with the text "St. Peter's University" overlaid on it. The right column is titled "News & Events" and lists three recent updates: "New PH.D. / M.PHIL. ADMISSIONS 2010-2011", "New Academic Schedule For M.Phil Programme", and "New ON-CAMPUS INFOSYS". Below the main content, there is a paragraph of text describing the university's history and accreditation. At the bottom of the page, there are two sidebars: "About us" with links to Administration, The Campus, Placement & Training, and Compliance; and "Downloads" with links to Application, BE - B.Tech Curriculum, MCA Curriculum, MBA Curriculum, and Mandatory Disclosure. The Windows taskbar at the bottom shows the Start button, several application icons, and the system tray with the time 2:44 PM.

Website Construction, Designing and Maintenance for St. Peter's College of Engineering and Technology.

Department : Computer Applications


Team: Prof. Lata Ramasamy

ST. PETER'S COLLEGE OF ENGINEERING AND TECHNOLOGY
(APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO ANNA UNIVERSITY OF TECHNOLOGY, CHENNAI)
AVADI, CHENNAI-600 054, TAMIL NADU, INDIA


HOME ABOUT SPCT DEPARTMENTS COURSES FACILITIES ACTIVITIES WEB MAIL

Welcome

St. Peter's College of Engineering and Technology, a co-educational college was established by Lakshmi Saraswathi Educational Trust in the year 2008. The college aims to impart training to students to develop their Intellectual powers, identify and cultivate interest and talents, and train them to become responsible and eminent citizens of India. The institution is spread over a sprawling campus with its calm surrounding, creating a study atmosphere. The institute provides a clean and invigorative environment conducive for higher education.



About Us



The Lakshmi Saraswathi Educational Trust was established as a public charitable

NEWSLETTER

[Click Here ..](#)

IMAGE GALLERY

- [Lab Photos](#)
- [Seminar & Conference Photos](#)

NEWS & EVENTS

SPCT Councelling Code
B.E/B.Tech -1127
M.B.A - 658

Anti Ragging Measures
[Read more...](#)

July 11-23, 2011
AICTE sponsored Staff Development Programme on Disaster Management for Engineering and Management Faculty. [Read more...](#)

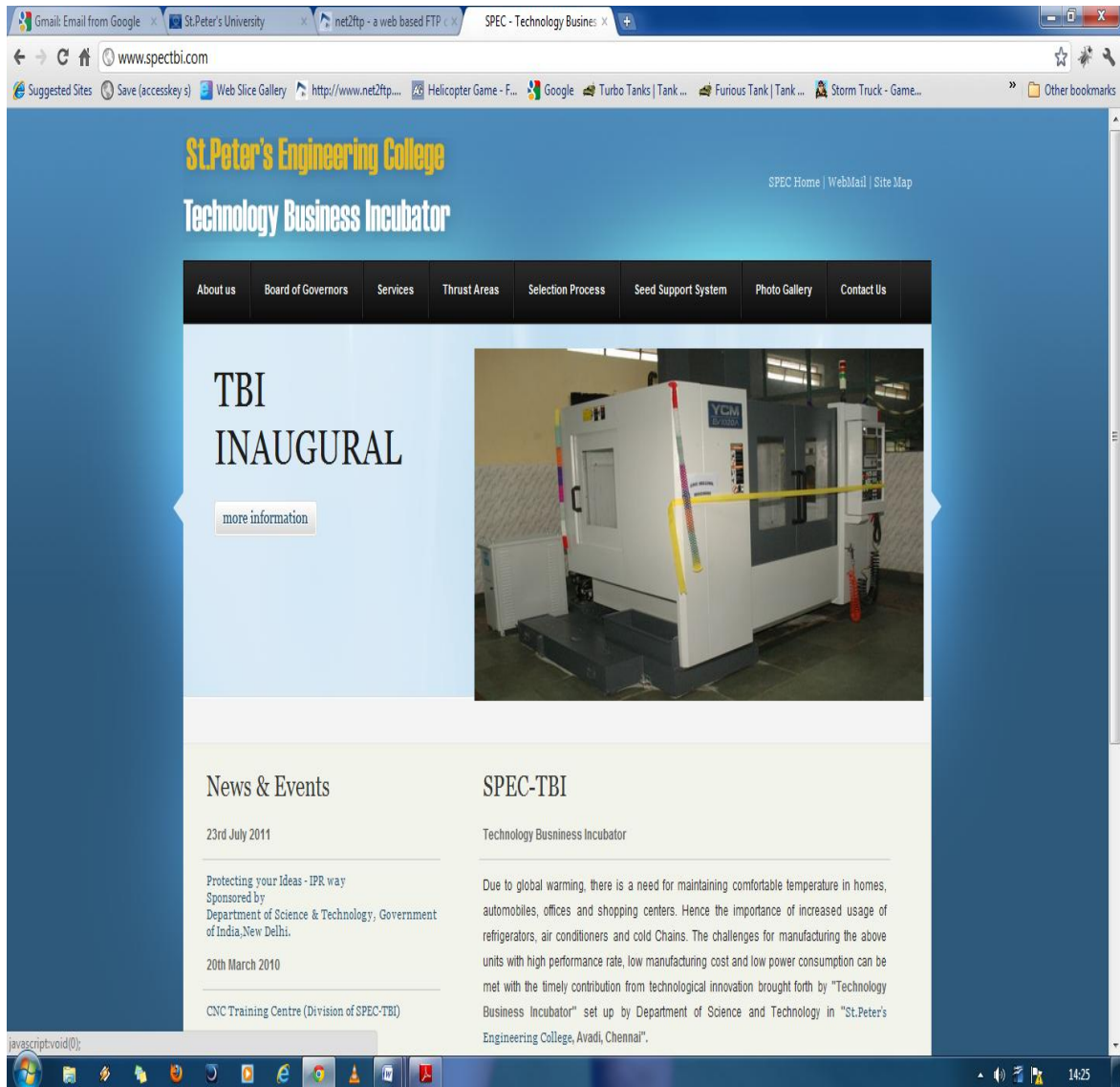
Aug 24-26, 2011
CSIR sponsored National

CONTACT INFO

College Address
College Road, Avadi,
Chennai, Tamilnadu,
India.
Pincode: 600 054.
Email: spcet2008@gmail.com
Phone: 044-26558089,
26558080-84
Fax: 044-26558091

Website Construction, Designing and Maintenance for St. Peter's TBI Department : Computer Applications

Team: Prof. Lata Ramasamy



PROJECTS APPLIED FOR GRANT

Sl.No.	Title of the Project	Sponsoring Agency & Ref. No.	Project cost (Rs. in lakhs)
1.	Development of Mediatorless Microbial cell by using cattle Rumen fluid with hay as a Substrate Department of Biotechnology Principal Investigator : Prof.Dr.M.V.Meignanalakshmi	Ministry of New & Renewable Energy November, 2007	25.36
2.	Production of Novel Glycopeptides Antibiotics from soya bean and Buffalo Milk Protein Department of Biotechnology Principal Investigator : Prof.Dr.M.V.Meignanalakshmi	Dept. of Biotechnology, Gol July, 2007	18.00
3.	Production of peptide antibiotics, antiviral and anticancer peptide drugs for Indian oyster mushroom protein Department of Biotechnology Principal Investigator : Prof.Dr.M.V.Meignanalakshmi	Dept. of Science & Technology SERC Division November, 2007	26.22
4.	Robust Model based nonlinear system identification, control and fault diagnosis Department of Electronics and Instrumentation Engineering Principal Investigator: Mr.M.Suresh, Asst. Prof.	Dept. of Science & Technology SERC Division 19.11.2009	20.40
5.	Mechanical properties of Composite Materials of Tamarind seed gum-sisal fibre Department of Chemistry Principal Investigator : Dr.Sayeeda Sultana	Tamil Nadu State Council for Science and Technology 24.8.2009	2.58
6.	Environmental effects on Geopolymer Concrete Civil Engineering Department Principal Investigator : Dr.D.S.Ramachandra Murthy	Tamil Nadu State Council for Science and Technology 29.8.2009	3.55
7.	Analysis of Expectations of Second Childhood Department of Management Studies Principle Investigator: Dr.R.Gayatri	Dept. of Science & Technology 25.08.2009	11.67
8.	Advanced Computer Security Department of MCA Principle Investigator: Prof. R.Latha Co-ordinator: S.Brindha	AICTE 31.07.2009	1.8375
9.	Semantic Web Data Integration and Ontologies Department of MCA Principle Investigator: Prof. R.Latha Co-ordinator: D.S.Davis Ethel	AICTE 03.08.2009	2.50

10.	Corrosion Studies on Geopolymer concrete Department of Civil Engineering Principal Investigator : Dr.D.S.Ramachandra Murthy	Tamil Nadu State Council for Science and Technology 17.08.2009	0.15
11.	Dynamic modeling simulation and implementation of multi input small power renewable energy supply system realized by special power electronics Department : Electronics and Instrumentation Investigator: Dr. R. Rani Hemamalini Mr. S.Sundaramoorthy	Ministry of New and Renewable Energy	40.00
12.	Studies on Geopolymer concrete Department of Civil Engineering Investigators: Dr.D.S.Ramachandra Murthy Dr.K.Jagadeesan	Fly ash Unit Department of Science and Technology	37.59 [√]
13.	Development of fly ash database with a specialized library Department of Computer Applications & Department of Civil Engineering Investigators: Dr.Lata Ramasamy Dr.D.S.Ramachandra Murthy R.Subhashni, Mr.P,Chidambaranathan, Ms.C.Chella Gitta	Department of Science and Technology	72.00
14.	Antioxidant and antibiotic activity of medicinal plant – costus speciosus linn. Plant extract on diabetes induced swiss albino rats Department of Biotechnology Investigator Dr.K.Valivittan	UGC	4.938 [√]
	Total		266.538

[√] Funds awaited.