Compendium of R&D Projects

Important
Sponsored Research Projects and Consultancy Projects
Executed by

New Horizon College of Engineering
Bangalore

Research and Development Cell
New Horizon College of Engineering

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New Horizon College of Engineering

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Many sponsored research projects and consultancy projects executed by NHCE have been received over whelming appreciation from various sections for its innovative way of execution and cost effectiveness and have also been received many awards/honours. Hence it became imperative to collate all such important research results and consultancy projects of NHCE in the form of Compendium as a record for future reference. The support provided by our Chairman, Principal, Deans, Heads of Departments, Professors and Senior Faculty Members in matters, both academic and otherwise is greatly acknowledged.

We would like to express our gratitude to all the Principal Investigators, Co-Principal Investigators, Domain Experts from Industries, Coordinators and Student Members who have contributed immensely for the timely completion of all the sponsored research projects and consultancy projects at NHCE. We also record our gratitude due to many people who saw us through this compendium; to all those who provided support, talked things over, read, wrote, offered comments, allowed us to quote their remarks and assisted in the editing, proof reading and design of reports of various projects.

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Our respectful thanks are extended to our parents. Above all we want to thank our family, who supported and encouraged us in spite of all the time it took us away from them. It was a long and difficult journey for them. We thank them for their patience, moral support and cooperation during the execution of the sponsored research projects and consultancy projects.

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-The Principal Investigators & Co-Principal Investigators of Projects

Preamble

New Horizon Educational Institution (NHEI), one of the premier educational institutions of Bangalore, was established in 1970. NHEI has an imposing history of innovative education, with a vision and mission to impart holistic education to all its students. The name "New Horizon" is synonymous with creditable performance, committed training, honing of skills, manifestations of talents, nurturing of character and development of a holistic personality.

NHEI has promoted New Horizon College of Engineering (NHCE), which is an Autonomous College Affiliated to Visvesvaraya Technological University (VTU), Approved by All India Council for Technical Education (AICTE). It is an ISO 9001:2008 Certified Institution. NHCE is located in the heart of the IT capital of India, Bangalore. The college campus is situated in the IT corridor of Bangalore surrounded by MNCs and IT giants such as Intel, Accenture, Cape Gemini, ARM, Symphony, Wipro, Nokia, JP Morgan and Cisco to name a few. NHCE has a scenic and serene campus that provides an environment that is conducive for personal and intellectual growth. The institute places the highest priority on innovative programs of instructions that include both traditional class room theory and professional skills training. There is a strong impetus on overall personality development of the students with emphasis on soft skills. Students are supported through mentoring and counseling systems.

NHCE inspires a passion for creative learning through a progressive approach to education that values intellectual pursuit, creativity, diversity and community involvement. NHCE has evolved innovative teaching and learning strategies coupled with best practices for real professional knowledge transfer to the students. Both the physical and intellectual infrastructures are in place at NHCE are best in the class in India. The state of the art professional governance and management through the real empowerment has ensured the continuous improvement of students and faculty members at NHCE.

Nine departments have been approved VTU as research centers to pursue PhD/MS (Engg) Programmes. R & D Cell organizes various research activities through the Research Coordinators at various departments. NHCE has high bandwidth (200mbps) internet connectivity & Wi-Fi facility. 10% of institution budget is allocated towards supporting research activities. The various facilities to strengthen the R&D activities at NHCE are Nokia Mobile Innovation Lab, Center for Intelligent Imaging Solutions, Center of Excellence for Edufotainment on Wheels, Technology Business Incubation Center, ERP Center of Excellence and Center of Excellence of Digital Learning Resources etc.

The various Grants has been Received towards Sponsored Research and Consultancy Projects at NHCE are tabulated below for the last 4 years:

Nature of Grant	2015-16	2014-15	2013-14	2012-13	Amount
Research Projects	66,79,000.00	11,41,000.00	42,05,876.00	29,31,000.00	1,49,56,876.00
Consultancy Projects	34,35,000.00	28,88,980.00	25,18,400.00	-	88,42,380.00
Total	1,01,14,000.00	40,29,980.00	67,24,276.00	29,31,000.00	2,37,99,256.00

Here an attempt has been made to showcase the salient features of important sponsored research and consultancy projects executed at NHCE. The **Compendium of R&D Projects** delineates the innovative components and contributions of R&D team at NHCE and also highlights the importance and significance of various projects for the development/betterment of our country. In the era of knowledge economy, NHCE strives hard to bring in frugal innovation and file highest number of patents to galvanize the culture of creativity and innovation at every campus in India.

Dr. K. Gopalakrishnan
Dean (R&D)
Editor, Compendium of R&D Projects

7D Motion Simulators with
6Degrees of Freedom (6DoF) and 3 Degrees of Freedom (3DoF) Operated by Hydraulic System or Pneumatic System

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Introduction:

The 7D+ Attraction brings together an immersive real life experience on-screen and sensational seat simulation coupled with special effects that are bound to enthrall our visitors. Historically, 7D Attractions have been thought of as a fringe benefit added to numerous other entertainment options in a mall or a theme park, but this idea is rapidly changing and making way for a truly world class movie experience. The technology that goes into the making of a 7D Attraction is truly world class as it combines the best in the business of audio-visual equipment including extreme performance control systems and high-end simulation. The 7D Attraction adds a layer of immersive fun for our visitors by treating them to experience the world of not only audio-visual but also other sensory effects such as Touch (Ticklers), Smell (Aroma), Movement of Seats, Combination of Rain, Wind, Snow, Bubble, and Lightening Effects.

The complete 7D Attraction system consists of (i) Motion Seats built on Motion Base operated by either pneumatic or hydraulic cylinders and Special Effects (SFX), (ii) Projection or Video equipment, (iii) Audio equipment, (iv) Motion controllers and drivers, (v) Hardware/Software to co-ordinate the synchronizations. The entire visual pleasure is built on "Stereoscopic 3D Technology" or S3D, however, the primary experience and feel is precisely depends on the 6DoF (having 6 cylinders) or 3DoF (having 3 cylinders) Motion base or platform where seats are to be mounted.

New Horizon College of Engineering (NHCE), Bangalore has been jointly designed and developed the 6DoF Hydraulic Motion Simulator with 7DPlus Technology Network Company, a startup encouraged by NHCE successfully. Two sets of 6DoF Motion Simulator with 10 Seats has been developed for mounting at Expandable Auditorium On Wheels built by Hi-Tech Engineers another Company nurtured by NHCE.

Motion Simulator Platform:

Motion Platform is also called motion base, it generates the motions for the simulators. Motion Platform is the essential component of the training simulators and amusement simulators, like flight simulators, ship simulators, tank simulators, car driving simulators, train driving simulators, earthquake simulators, capsule motion simulators, motion theaters, 4D theaters, 6DOF 4D motion theaters, flying theaters and immersive motion theaters. At present we are able to offer 3 DOF and 6 DOF pneumatic, hydraulic and electric motion platforms for amusement applications and military applications, and our hundreds of motion platforms have been widely installed in China domestic and international projects.

Pneumatic Motion Platform is the low cost solution, and to be frank it is hard to control the motions of the pneumatic motion platform precisely. So at present pneumatic motion platforms are only installed in the low end amusement simulation applications. In fact pneumatic motion platforms from different suppliers adopt different design and technologies, and the performance is quite different. Our pneumatic motion platforms adopt the best design and technologies in the market, and their performance is much higher than the average level.

And our 3 DOF and 6 DOF pneumatic motion platforms are installed in our 4D-7D Theaters and 6 DOF 4D Motion Theaters, 2 or 4 seats are installed on the 3 DOF pneumatic motion platforms, and 4 or 5 or 10 seats are installed on the 6 DOF pneumatic motion platforms.

Hydraulic Motion Platform is the traditional motion platform in the high end market, we may offer hydraulic motion platforms with different payloads and different motion specifications. Please see below the technical specifications of three 6 DOF hydraulic motion platform models, MP-6DOFH-07, MP-6DOFH-15 and MP-6DOFH-30, for your reference, and we are able to offer customized hydraulic motion platforms. Based on the requirements of customers regarding the 6DOF hydraulic motion platform, we could build it for them!

Model	MP-6DOFH-07		MP-6DOFH-15		MP-6DOFH-30		
Specifications							
Payload	700Kg		1.5T		3T		
Weight	350Kg		0.9T		1.5T		
Platform Dimensions	L:1700 W:1700 H:700(mm)				L:2200 W:2200 H:900 (mm)		
Working Temperature	0-40℃		0-40℃		0-40℃		
Pump Station Specifications							
Pressure	8Mpa				9Mpa		
Voltage	AC380V				AC380V		
Rated Power	11KW				15KW		
Motion Specifications							
Cylinder Velocity	200mm/s				200mm/s		
Cylinder Stroke	200mm				300mm		
DOF	Stroke	Velocity	Acceleration		Stroke	Velocity	Acceleration
Yaw	22°	25°/s	200°/s²		16°	25°/s	220°/s²
Pitch	23°	25°/s	200°/s²		15.6°	25°/s	220°/s²
Roll	23°	25°/s	200°/s²		16°	25°/s	220°/s²
Surge	210mm	200mm/s	0.9G		230mm	200mm/s	0.9G
Sway	160mm	180mm/s	0.9G		190mm	180mm/s	0.9G
Heave	260mm	160mm/s	0.8G		400mm	160mm/s	0.8G

The hydraulic motion platform system includes hydraulic pump station, accumulator, platform, control cabinet, control computer, hydraulic pipelines and control cables.

Six Degrees of Freedom (6DoF):

The six degrees of freedom are forward/back, up/down, left/right, pitch, yaw, roll as shown in figure below:
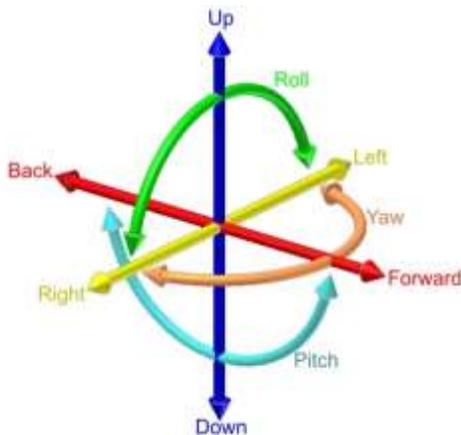
Six degrees of freedom (6DoF) refers to motion of a rigid body in three-dimensional space, namely the ability to move forward/backward, up/down, left/right (translation in three perpendicular axes) combined with rotation about three perpendicular axes (pitch, yaw, roll). As the movement along each of the three

axes is independent of each other and independent of the rotation about any of these axes, the motion indeed has six degrees of freedom. Notice that the initial conditions for a rigid body include also the derivatives of these variables (velocity and angular velocity), being therefore a 12-DOF system.

Electric Motion Platform is the high end motion platform with advanced features: high accuracy, fast response, low noise, low power consumption. We have several standard 3DOF and 6DOF electric motion platform models, and we are able to produce customized electric motion platforms also, the client may specify the excursion, velocity, acceleration, accuracy and payload. In general the payload for our electric motion platform is between 200Kg to 14 Ton.

Model	MP-3E-500F	MP-3E-1000F
Payload	500 Kg	1,000 Kg
Maximum Excursion		
Heave	± 25cm	± 30cm
Roll	± 30°	± 30°
Pitch	± 30°	± 30°
Maximum Velocity		
Heave	±0.50m/s	±0.50m/s
Roll	±30°/s	±30°/s
Pitch	±30°/s	±30°/s
Maximum Acceleration		
Heave	±1.0 g	±1.0 g
Roll	±650°/sec²	±650°/sec²
Pitch	±650°/sec²	±650°/sec²

Model	MP-6E-500F	MP-6E-1000F
Payload	500 Kg	1,000 Kg
Maximum Excursion		
Surge	± 50cm	± 55cm m
Sway	± 50cm	± 60cm
Heave	± 37.5cm	± 36cm
Roll	± 35°	± 26°
Pitch	± 30°	± 29.5°
Yaw	± 45°	± 37°°
Maximum Velocity		
Surge	50cm/sec	50cm/sec
Sway	50cm/sec	50cm/sec
Heave	50cm/sec	50cm/sec
Roll	50°/sec	50°/sec
Pitch	50°/sec	50°/sec
Yaw	50°/sec	50°/sec
Maximum Acceleration		
Surge	1.0 g	1.0 g
Sway	1.0 g	1.0 g
Heave	1.0 g	1.0 g
Roll	1000°/sec²	1000°/sec²
Pitch	1000°/sec²	1000°/sec²
Yaw	1000°/sec²	1000°/sec²

Courtesy: www.ckas.com.au

Special Effects Built On the Seats:
4D-7D Simulation Theater Effects Chair system consists of six effects seats, one 6 DOF hydraulic motion platform system and one chair control box. The six effects seats are installed on the 6 DOF hydraulic motion platforms. These Chair system is ideal for the advanced 4D/5D/6D/7D Motion Theaters, and its strong motion effects distinguish itself from other conventional 4D theater chairs, and it is the hot star in the 4D-7D theater industry.

It is the 3rd generation hydraulic 4D effects chair. The 3rd generation 6DOF hydraulic 4D effects chair continues to adopt closed-loop control with imported high precision proportional valve and high precision displacement sensor. And the chair adopts brand new control system; the system hardware adopts the digital circuit and new CPU, instead of the analogue circuit. The new hardware system can execute more complicated control algorithm, and the control is much more accurate, and it has much better anti-interference capacity.

What's more, the 3rd generation 6DOF hydraulic 4D effects chair adopts new frequency conversion pump station system to save energy up to 50% by reducing the motor rotating speed, and the noise is greatly lowered. The new frequency conversion pump station system installs flow sensor at the output end to control the speed of the frequency conversion motor to execute the close-loop control for the flow output. This means that the new pump station system controls the motor rotating speed to offer the right flow that the system demands. While the powers of the traditional pump station system is always the peak power to ensure the peak output. In fact at most time during the system operation, such strong power is not needed at all, and the redundant power becomes thermal power and goes back to the pump station through relief valve, and the energy is wasted.

The 2nd generation 6DOF hydraulic 4D effects chair adopts high-power pump station, imported hydraulic pump and filter system and heat dissipation system. And the system adopts the closed-loop control with imported proportional valve and high precision displacement sensor. The advantage of the closed-loop control is that the control system gets feedback of each motion of the hydraulic cylinder, and performs corresponding control. It is like driving the car, and the driver may perform real-time control, so the safety level is higher. The system adopts imported high precision proportion valves and high precision displacement sensors, and the motion of the chairs match well with the film content. The 2nd generation 6DOF hydraulic 4D effects chair adopts analogue circuit.

The 1st generation 6DOF hydraulic 4D effects chair adopts the common hydraulic cylinders and open-loop control system, the system adopts switch valves, low end pump station and motor, and the displacement sensor and hydraulic oil filter system are not installed. The hydraulic cylinder can only move at one fixed velocity, the switch valve switches on and off frequently and the motion platform gets strong impact, the platform shakes dramatically, it is hard to control the motion, the motion of the chairs do not match well with the film content. The 1st generation 6DOF hydraulic 4D effects chair adopts analogue circuit. At present most of the 6DOF hydraulic 4D effects chairs made in China and Korea in the market are still the 1st generation 6DOF hydraulic 4D effects chairs, and we do not offer the 1st generation 6DOF hydraulic 4D effects chairs.

The reason that we do not offer the 1st generation 6DOF hydraulic 4D effects chairs is that we believe the 1st generation 6DOF hydraulic 4D effects chairs are not safe at all, and in our opinion the safety is the most important standard for the amusement equipments. The pressure of the hydraulic system is high, and the power is strong, if we adopt the open-loop control system, it is hard for us to control the motion. The motion of the 1st generation 6DOF hydraulic 4D effects chairs seems dramatic, but there are great potential safety risks, so we stopped its development.

Comparison of 1st, 2nd and 3rd Generation Hydraulic System for Motion Platform

| Hydraulic 4D effects chair	Valve for each cylinder	Displacement sensor	Signal input	Pump station
Generation 1	One switch valve	None	Analogue	Common
Generation 2	One proportional valve	Yes	Analogue	Common
Generation 3	One proportional valve	Yes	Digital	Energy-saving and low-noise

Specifications of Motion Platform:

Cylinder Velocity	200 mm/s		
Stroke	200 mm		
DOF	Stroke	Velocity	Acceleration
Yaw	22°	25°/s	200°/s^2
Pitch	23°	25°/s	200°/s^2
Roll	23°	25°/s	200°/s^2
Surge	210mm	200mm/s	0.9G
Sway	160mm	180mm/s	0.9G
Heave	260mm	160mm/s	0.8G
Pump Station Specifications			
Pressure	8Mpa		
Voltage	AC380V		
Rated Power	11KW		

6DoF Hydraulic Motion Simulator Platform:

Components of 6DoF Hydraulic Simulator:

oil pump made in Taiwan

tube thickness: 4mm

tube highness:50mm

motor made in Taiwan

buffer solenoid valve made in Taiwan

the wall thickness of edge: 12mm

high standard oil line manifold

High quality with glib rob end bearing

free maintenance multi-locking

tube width：100mm
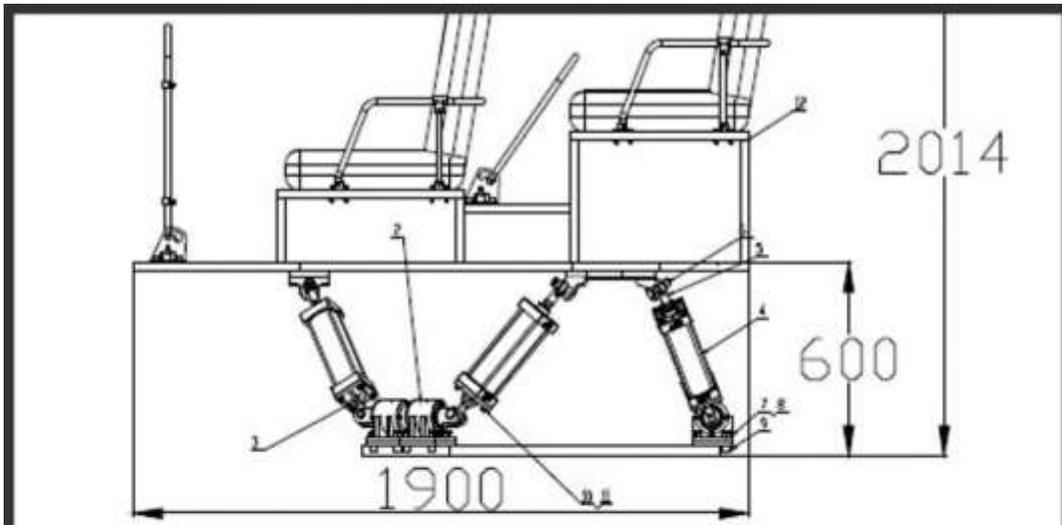
6DOF 6seats hydraulic platform the lowest state dimensioned drawing
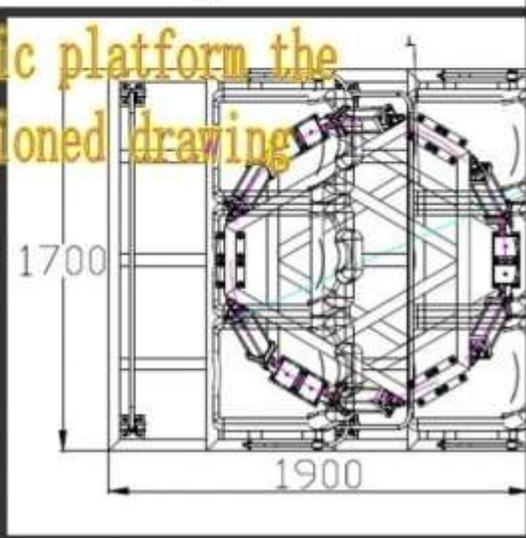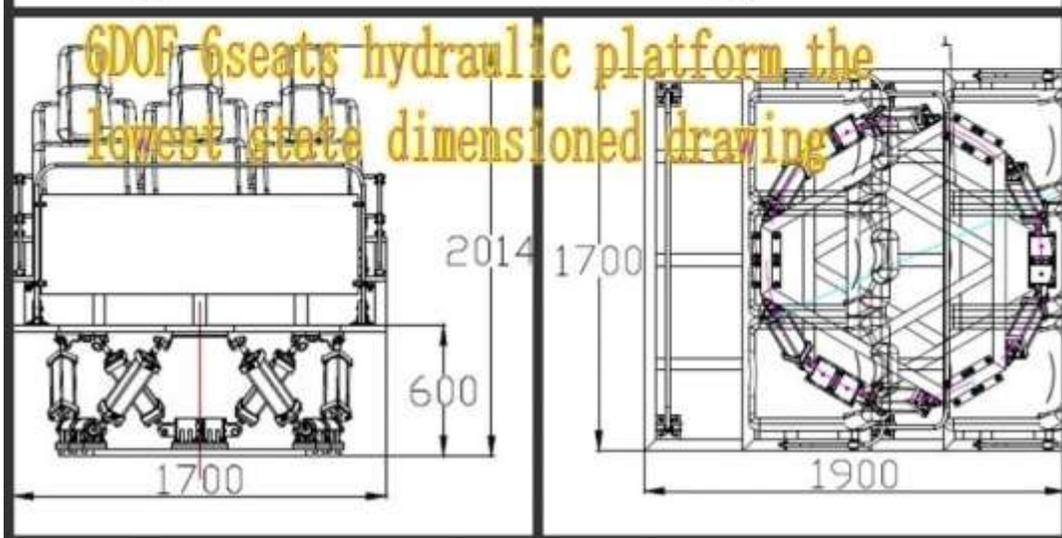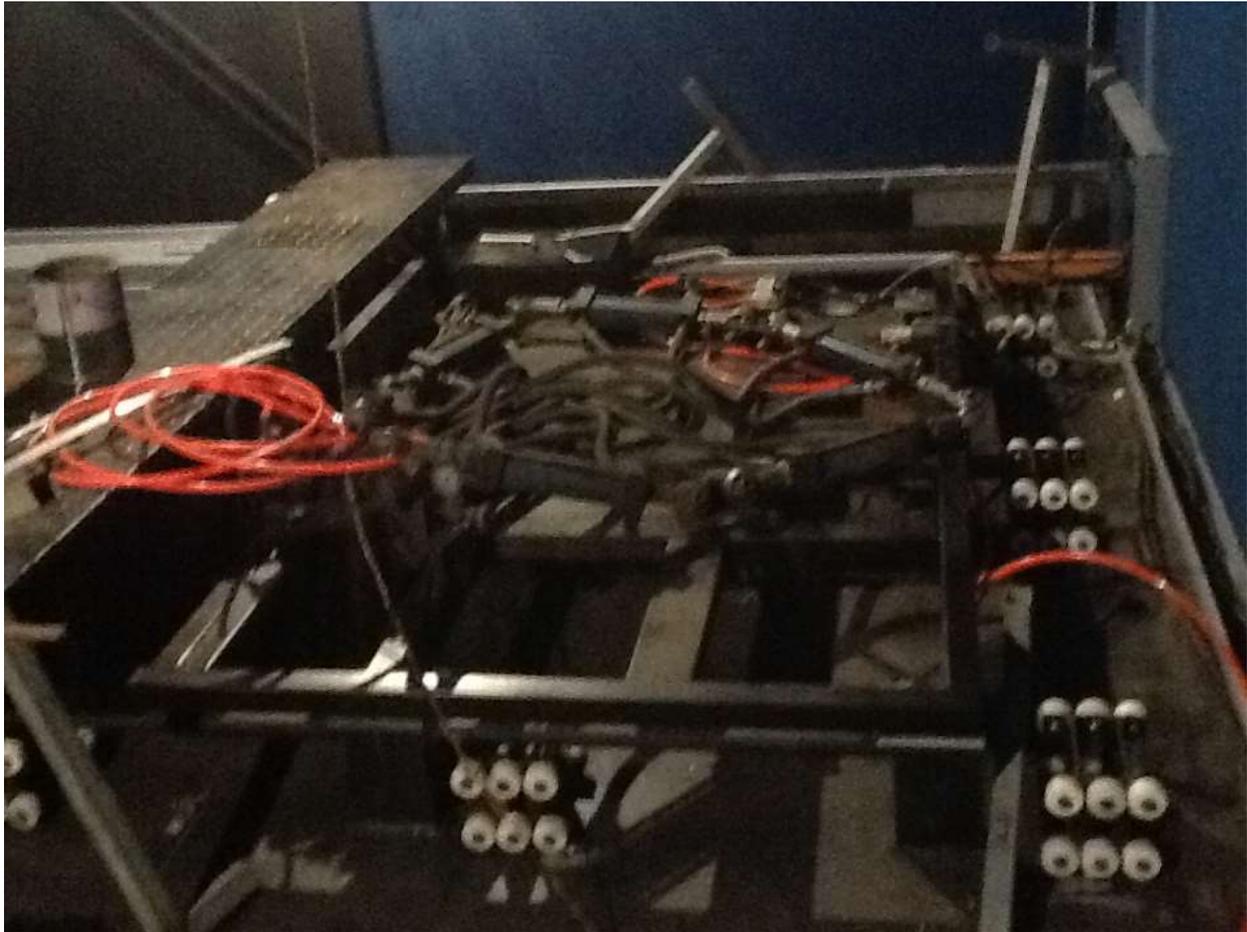
6DoF Simulator Dismantled for Testing

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Motion Files Acquisition System for 7D Motion Simulators with 6Degrees of Freedom (6DoF) and 3 Degrees of Freedom (3DoF) Operated by Hydraulic System or Pneumatic System

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Introduction:

The immersive experience/visual pleasure in any virtual simulations of 4D-7D Theatres or Motion Simulators are depends on the synchronizations of seat movements in sync with the 3D visuals on the screen. In turn, the sync of seat movements are precisely depends on the motion files embedded on the movie files. Hence, acquisition of motion files of any 3D movie clip or ride movie or animated contents in 3D is important for achieving the satisfaction of the viewers. The old and traditional method of acquiring motion file is to edit only by software in the 4D movie industry. It takes at least 3 days to edit or make a good motion file of 10 minutes of movie. Therefore the person editing 4D movie motion files feels very tired and boring. It is a time consuming process with less productivity, manpower cost and cost of 4D movie cinema suppliers and operators becomes prohibitively expensive with conventional method.

New Horizon College of Engineering (NHCE), Bangalore has been jointly executed the project of acquisition of motion files for 3DoF Hydraulic Motion Simulator movie clips with 7D+ Fun Corner, a startup encouraged by NHCE successfully. Motion files have been acquired by the team from MCA Department of NHCE and experts from Bluechip Amusements/Hi-Tech Engineers, which is also another Company nurtured by NHCE. JMDM-4DMMAU Automatic Acquisition System has been used.

Special Effects (SFX) of 4D-7D Theatres/Motion Simulators:

Motion Seats and SFX

The motion seat forms the core of the 7D experience wherein the guest moves in 3 DOF (Degrees of Freedom) in space in a manner that is synchronized with the events on-screen. These motion seats are specially developed in order to simulate real life sequences that appear on-screen and are powered by world-class pneumatic actuators that make up the motion base.

Each of these pneumatic motion bases can host either 2 or 4 seats and houses 3 pneumatic actuators and a specialized control box. These motion bases can move in 3 different axes which are roll, pitch and heave, in layman terms, the seats move up/down, tilt forward/backward and tilt sideways. In contrast to this conventional method, we have introduced *India's first 6 Degrees of Freedom (6 DoF) hydraulic platform On Wheels with 64 actions of seat movement along with other World Class theater effects.*

Seat SFX

The seats also come with several special effects that form an integral part in creating an immersive experience.
   a) Leg tickler - flexible air tubes that tickle your lower ankles
   b) Water spray - surprise water spray on your face
   c) Butt tickler - thrusting upward from the bottom seat cushion
   d) Back poker - thrusting forward from the back seat cushion
   e) Seat vibrator - complete seat vibrator mechanism
   f) Neck blast - powerful jet of air on the back of your neck

Theatre SFX

The auditorium houses some of the special effects.

    a) Rain effect - water sprinklers from the roof

    b) Wind effect - powerful blowers on either side

    c) Lightning effect - powerful strobe lights near the screen

    d) Snow effect - snow machines on either side

    e) Bubble effect - bubble machines beneath the screen

    f) Aroma effect - aroma machines on either side

    g) Fog effect- smoke machine beneath the screen

Motion Control

Industrial grade pneumatic or hydraulic actuators control the seat motion. The motion control computer acts as an interface between the actuator and the seats by synchronizing the movements based on the sequences in the movie and appropriate effects.

JMDM-4DMMAU Automatic Acquisition System:

JMDM-4DMMAU is Shenzhen Jingmin Digital Machine Co., Ltd., independent research and development of a 4D/5D-7D theater seats and special collection device, also called 4D dynamic generator, 4D film source 4D seats and special effects, 5D dynamic cinema effects generated system, 6D cinema movement automatically generate device acquisition system.

It gathers as innovative design of seat action and the special effects sampling device, acquisition controller, control software, power supply for the part of combined with a normal computer, which constitute a complete set of 4D5D cinema action and special effects collection system.

Through this device, one can easily acquire the motion files for any movie clips:

    a) Simple and rapid and dynamic production file, watching the movie, at the same time to complete the process of making dynamic file where a dynamic file time length is equal to the film.

    b) Significantly improve the speed of the launch of 4D5D sources: convenient 4D cinema provider or operator will quickly a large number of ordinary 2D/3D video productions into 4D/5D-7D movie, significantly save time, manpower, material resources and financial resources.

    c) Greatly liberating laborious human effort on the software of the edit action, improve the efficiency of 3D film editing action files generated.

    d) Perfect solution provider to operators of 4D-7D cinema which has faced acute short supply of 4D-7D film source, 4D film slow action sequence generation, the generation process trivial difficult problem.

Performance of JMDM-4DMMAU (4D Movie Motion Acquisition Unit):

1. *JMDM-4DMMAU (4D Movie Motion Acquisition Unit) Categories:*

   According to the movement direction of the seat platform, can be divided into two kinds: three degree of freedom system, six degree of freedom system.

2. *Jingmin Digital 4D Dynamic Acquisition System:*

   Complete a Dynamic Acquisition System including: three or six degrees of freedom seat action and special effects collector, JMDM - COM4DFILM 4D cinema controller, power supply, a serial port line, Jingmin Digital 4D control software edit-end and client-end (including two dongles), user with ordinary home computer (WIN2000/XP/Windows7,etc).

Current Scenario:

In the demands of customers in order to liberate manual acquisition of motion files and reduce the cost, JMDM created the method of editing motion files by JMDM-4D auto-editor software and 4D-7D chair motion pickup and effects acquisition unit operated by 2 persons.

The JMDM-4D cinema control software and controller are the core control parts in a 4D-7D cinema (Video Simulator). It can make all 4D cinema equipments work with sync without any time delay or asynchronous phenomenon while playing the 3D movie and *.jm motion file. The process of making motion files is the critical point. JMDM-4D editor is used to make the motion file by collecting the movement of chair motion pickup unit and effects acquisition unit operated by two persons.

JMDM-4D player is used to play 4D-7D movie which consists of 3D movie and *.jm motion file.

Description:

JMDM-4D movie acquisition system consists of chair motion pickup unit (3 Degrees of Freedom or 6 Degrees of Freedom), effects acquisition unit, JMDM-COM4DFILM acquisition controller, the power supply, JMDM-4D editor software.

Function:

There is a function named of auto-read (auto-acquisition) in the JMDM-4D movie control software (JMDM-4D editor).

JMDM-4D movie acquisition system can help 4D suppliers or operators edit easily large numbers of 3D movies as 4D motion movies in short time. The time length of movie is how long you will spend to edit the motion file of a movie.

This motion acquisition system and JMDM-4D control software can make 2 motion file (*.jm and *.xls) with the same name with movie quickly while watching the 3D movie.

.xls can be checked and modified the motion. After modification, using the function named of read .xls file in JMDM-4D editor, then JMDM-4D editor can make a new motion file:.jm automatically while covering the previous *.jm.

When the JMDM-4D player plays a 3D movie,*.jm file same name with a movie will be invoked synchronously. As the source of 4D movie motion, this *.jm file is the most important role and big difference between 4D movie and common 3D movie.

Contrast:

Old Traditional Method Practiced in the industry:

The old method of making motions files is to edit in the unit of 0.1 or 1 second by a person only in the control software. It will take at least 3 days to edit or make a good motion file of 10 minutes of movie. The person needs to know how 3 or 6 cylinders work and click countless mouse, so editing 4D movie motion files make him feel very tired and boring. It resulted in wastages the time, manpower cost and money for 4D movie cinema suppliers and operators.

Contemporary New Method Motion Files Creation by JMDM:

2 persons neither need to know how cylinders work, nor need to know some professional programming language. What they need to do is very deeply committed to watch the movie and experience the playing role and audience's feeling, meanwhile operating the JMDM-4DMMAU equipment so as to make the correspondent movement with the movie scene.

JMDM-4DMMAU 4D movie collection system for dynamic 4D-7D seat 4D-7D film sources and effects movement collector, 4D cinema dynamic effects generation system, 4D cinema dynamic auto-generation device, the action acquisition system!

Agile Digital Solution is the requirements of majority of customers, the successful launch of 4D cinema film source acquisition system satisfied requirements of dynamic action and special effects!

1. JMDM-4DMMAU (4D Movie Motion Acquisition Unit) Category: Motion capture system is divided into 3DoF; 6DoF motion capture system;

2. Agile Digital 4D dynamic movie collection system components: including: three (or six) free degree seat action and special effects collector, JMDM-COM4DFILM 4D cinema controller, power supply, serial cable, JMDM-4D editor 4D cinema editing software (including dongle).

3. Applicability and Compatibility: JMDM-4DMMAU acquisition system files generated by action, not only for high-end road JMDM-COM4DFILM 20 with a sensor control system, and can be perfectly compatible JMDM-4DI16MT 16 channel low-end control functions without sensor. The control system for use JMDM 2 models Cinema 4D control system (JMDM-COM4DFILM, JMDM-4DI16DO), for the three-cylinder or a hydraulic cylinder or six-DOF motion platform seat action and special effects equipment acquisition.

4. Use: 3DoF/6DoF seat action and special effects logger with JMDM-COM4DFILM 4D cinema controller, 4D special effects action movie editing software, when used, will seat action collector fixed on the ground, As long as the two people watching the film edge collection actions, you can easily achieve 4D dynamic editing. A person responsible for collecting the seat action, a person responsible for special effects collection, movie watching, dynamic effects that acquisition completed, the control system software automatically collected and edited action documents, action movie Duration is the length of time to edit.

5. Features Contrast:

a) The original manual editing actions on the software the average time of two days: one about 10 minutes of 3D video, edit out the 4D effects and good debugging, a skilled take a few hours, a few days time to novices; and want to feel the experience of commissioning in the seat good results, usually the average time of about 2 days.

b) Now using JMDM-4DMMAU automatic acquisition systems equals Movie Length: Film Length is motion editing the length of time, and without debugging, dynamic effects by Agile Digital dynamic acquisition and 4D editing playback software systems automatically collect generate action file synchronization effect, soothing, smooth, smooth, delicate, very realistic, without debugging.

c) JMDM-4DMMAU advantage : Compared with the industry some of the collection system, differences and advantages: Agile digital acquisition system 4D action and special effects used in all self-developed controller hardware, 4D editing player software for the collection, that collection generating and playing action document software is the same software (JMDM-4Deditor & player), fully synchronized dynamic effects, there is no synchronization. 6, Value: liberated labor movement in the software to edit videos of toil and save time, improve 3D video editing actions file generation efficiency and help provider or 4D Cinema 4D cinema operators in the short time edit out multiple 4D Motion movie file, the perfect solution providers or operators 4D cinema generally faced fewer sources of 4D, 4D video motion effects generate slow, tedious build process difficult problems!

3DOF or 6DOF acquistion system include:3DOF or 6DOF acqustion unit,special effects unit,JMDM-COM4Dfilm controller,power supply,editor software(1 dongle) and serial port cable.

3DOF

6DOF

Motion File Acquisition Process:

1.Compare the control wiring diagram and control software editing software interface, connection acquisition system of wiring between components well, pneumatic platform with 6DOF as an example as below:

If you use 3DoF pneumatic platform, software interface without 4-6 cylinders, the wiring diagram of linear transducer 4-6 don't connect it.

Open the 4D the edit control software, picture above is 3DoF pneumatic platform applicable control software to edit client interface, automatic collection functions see the lower right area of the software surface "automatic acquisition" function.

1. **Connect Wires In Steps:**

   Connection JMDM-COM4DFILM 4D cinema acquisition controller and seat collector, special effects acquisition and the power supply; connect acquisition controller and computer serial port.

The specific wiring steps are as follows:

    a) DC 24V power supply connect pins 1 and 3, irrespective of positive and negative.

    b) Pin 23, 28 connect DC 24V+ power supply.

    c) Electic cylinder + and - connect pin 7, 8, electronic signal lines connect to position detection ports, its controller pin 9-15.

【prompt】:

If you find the acquisition of data and the collector position opposite, such as the collector after rising from the bottom to save data is:without linear transducer: from 1 to 0; with linear transducer: from 255 to 000, that means the linear transducer connect against the"+" and "-",then exchange it.

D.Special acquisition connection, generally according to connect standard the order of our companys software and hardware.

The black and yellow line -- -- -- -- -- -- 24 v cathode

White line -- -- -- -- -- -- -- ----snow -- -- -- -- -- -- -- -- -- 19 channel

Blue line -- -- -- -- -- -- -- -- --sweeping legs -- -- -- -- -- -- 20 channel

Orange line -- -- -- -- -- -- -- --the jet -- -- -- -- -- -- -- -- 21 channel

Brown line -- -- -- -- -- -- -- -- water -- -- -- -- -- -- -- -- 22 channel

Gray line -- -- -- -- -- -- -- -- -smoke -- -- -- -- -- -- -- -- --23 channel

Red line -- -- -- -- -- -- -- -- --bubble -- -- -- -- -- -- -- -- 24 channel

Green line -- -- -- -- -- -- -- --lightning -- -- -- -- -- -- -- 25 channel

Purple line -- -- -- -- -- -- -- spare -- -- -- -- -- -- -- -- -- 26 channel

2. Acquisition Method

    a) Before starting to acquisition, in the control software interface editor-end, set up collection of parameters.

        Accuracy: how much time you can set the acquisition time, unit is milliseconds, once every 100 milliseconds to acquisition by default.

        Forward lead: if feel collection is slower than the picture, can be moved forward, the acquisitions of action whole reach don't last for more than 300 milliseconds.

        Filtering: set the size of the filter, the default is 10. Can filter out some data; make the action more concise, but too little action may affect the effect; please adjust according to the actual effect.

    b) Click on the "automatic" button

    c) Choose acquisition film

    d) The operation of the acquisition unit

        When used it, the seat action acquisition fixed on the ground, one person is responsible for operating seat action acquisition, the other is responsible for the operation effects collector, first, familiar with the two acquisition related actions and the film content will be acquisition.

        As long as two people watch the movie, while according to the circumstances of the film to real-time operating seat action acquisition simulation of the corresponding cylinder or cylinder action, special effects of the collector switch operation action, you can easily implement action collection editor of 4D motion.

    e) Complete acquisition

Finish watching the movie, the dynamic effects complete acquisition, movie clip is generated the length of the movement, at this time; click the button "complete collection", save the data to complete collection. The software will automatically generate the same as the film titles of two action file: can

modify *. XLS file (used to edit, modify, EXCEL documents, do not need to supply customers), encrypted *. Jm file (used to play, to provide end users).

【 prompt 】: to end customer only provide: control software of the client (the players) and the corresponding dongle, film, and the corresponding.jm file. Players playing in fact just read. The action of *. jm file, so the.xls files do not need to provide to the customer.

3. Acquisition Skills

a) The way something suspended acquisition process:

Halfway to occupy, you can click the "suspend" button to stop acquisition, the film is automatically suspended play, "pause button" at this time has been shown as "continue to collection" button, such as ready before you click "continue to collect"

b) 3D video acquisition techniques:

When collecting long 3D film, for a 3D film is long, to avoid action file is too large, can be in the absence of action when clicking on the "suspend" button to collect, then click the play button above, to play the film, when playing to have action and click the button "continue to collect", thus to realize the collection of long film, and the action will not exceed the limit.

c) Modify not ideal acquisition fragment skills:

After collecting a film if you feel part of the action is not ideal, but the other parts are good. Can the timeline as reference, a separate collection that part of the action, and then dropped the XLS file new action to cover the original XLS file that part of the action, compare the time when cover. After save, click the "read. XLS" button, the modified to lead the.xls files updated .jm action file, then it is OK.

d) Only modify individual special skills:

If the acquisition process, slow gatherer, lead to some effects not operation in time, can open the *.xls files, to watch the movie, and view the corresponding point in time, then the *. XLS file corresponding to the time will be the special value of modified correctly (1 means open effects, 0 means closed effects). After the changes, save and close, click the "read. XLS" button, the modified ok to import the.xls files updated. Jm action file.

4. Test the Motion

After complete automatic acquisition system, mainly by the client-end to play, as the audience experience the effect in the seat, to test the related actions are accurate.

If you find some movie playback, no picture but there is sound and display the time, that computer is not the format of the decoder. You can download the "ultimate decoder", after the installation can be played normally, according to the default setting process.

5. Supply to Customer

Usually as a 4D cinema provider, eventually provide terminal customers is the film and the corresponding dynamic files (*.jm), Jingmin digital 4D control software client (players) and the corresponding dongle.

Applications of JMDM-4DMMAU (4D Movie Motion Acquisition Unit):

a) Used for 3D4D movie, simply, quickly and easily made with environmental effects and seat action sequence of 4D5D6D7D.

b) To help 4D cinema providers, breakthrough the limitation of content, an operator in a short period of time to make a lot of three-dimensional dynamic action movie file.

The applicability and compatibility

a) Applicability of JMDM-4DMMAU acquisition system generated motion file, is suitable for:

JMDM series many 4D cinema control system (JMDM-COM4DFILM,JMDM-4DI16DO,JMDM-COM20MR,JMDM-120DIOADD,JMDM-COMSERVO, etc.), used for pneumatic cylinder, hydraulic cylinder and electric cylinder motion platform, 3DOF and 6DOF platform seat action and special effects equipment acquisition.
Cannot be used for: other manufacturers of the control system; temporarily cannot be used in electric cylinder control system.

b) Compatibility

JMDM-4Dmmau acquisition system generated the action file, not only can be used for high-end JMDM-COM4DFILM 20 channels with linear transducer control system, and can perfectly compatible JMDM-4DI16MT 16 Channels and JMDM-COM20MR 20 Channels without linear transducer control function of control system, according to customers need for action sensitivity and quantity, within the software for a variety of data processing, so as to adapt to a variety of customized demand.

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Special Purpose Motor Vehicles:
Offers Integrated Solutions *On-Wheels* for Many Applications

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Introduction:

A Special Purpose Motor Vehicle (SPMV) is a defined as a motor vehicle or trailer, other than an agricultural vehicle or a tow truck, built for a purpose other than carrying goods such as a mobile crane, a concrete pump or drill rig. A SPMV that does exceed one or more of the general mass and dimension limits set out in the Heavy Vehicle (Mass, Dimension and Loading) National Regulation is then considered a Class 1 restricted access heavy vehicle.

SPMV, other than those principally designed for the transport of persons or goods *(for example, breakdown lorries, crane lorries, fire fighting vehicles, concrete-mixer lorries, road sweeper lorries, spraying lorries, mobile workshops, mobile drilling rigs, mobile radiological units, mobile hospitals, mobile auditoriums, mobile science labs, mobile computer labs, mobile class room, mobile hospitals, mobile launchers, mobile command centres, mobile hostels, outdoor broadcasting vans, mobile kitchens, mobile restaurants, mobile sound-proof genests, truck-on-trucks, car carriers etc.)*

Hi-Tech Engineers has been specialized in the design and development of SPMVs for the last two decades in Bangalore. They are specialized in SPMVs such as 1000 KVA Genset with Sound Proof On Wheels, Outside Broadcasting (OB) Vans, Hospital On Wheels (Mobile Dental Clinics), Kitchen On Wheels (Restaurant On Wheels), Auditorium On Wheels etc. They have also built Cluster of Bio-Toilets On Wheels for First International Air Show held at Bangalore. They are interested in SPMVs and regularly execute projects related to design and development of SPMVs for Indian Space Research Organisation (ISRO), Gas Turbine Research Establishment (GTRE), Defence Research and Development Organisation (DRDO), Aeronautical Research and Development Board (AR&DB), Bharat Earth Movers Ltd (BEML), National Aerospace Laboratories (NAL) and Hindustan Aeronautics Ltd (HAL) etc. They always strive for innovative and cost effective contemporary solutions for their projects. Recently, they have developed dental clinic kit for door to door service as "D2H" for M/s Mobident as "World Class Dental Care: Affordable & Accessible at your Door step" (http://www.mobident.in/).

Major Projects:

a) **7DPlus Simulator ON WHEELS or Expandable Multipurpose Auditorium On Wheels** built by Dr. K. Gopalakrishnan [presently Dean (R&D) at NHCE] in association with New Horizon College of Engineering, Bangalore and Hi-Tech Engineers as a prototype and proof of concept (PoC) to demonstrate the capability of interdisciplinary research out come and built its kind first time in India with the help of faculties and expertise available at Hi-Tech Engineers, Bangalore which has their Design Studio and Product Development Centre at New Horizon College of Engineering.

The "Expandable Multipurpose Auditorium" which could be used as regular Theater/4D-7D Theater/Seminar Hall/Class Room/Laboratory/Library etc. based on the needs/applications by overcoming the limitations imposed by Motor Vehicle Rules & regulations of various countries and will achieve "Portability, Expandability & Compactability in design" through Innovation and will result in many fold increase in floor area and/or volume inside the truck/bus while it is in stationary.

Russian Federation (Rospatent) International Patent No. 152801

b) Outdoor Broadcasting (OB) Vans:

SMALL & MEDIUM
OB VANS

Image Courtesy: http://thechameleon.weebly.com/ob-van-station.html

c) **Sound Proof Mobile Acoustics DG sets (Higher KVAs):**

Hi-Tech Engineers has been built Mobile Acoustic DG Sets with capacity more than 1000 KVA -25000 KVA (approx.) for rental fleet of DG Sets for SriLalitha Electricals (http://srilalithaelectricals.com/) and Sinewave Generators Private Ltd (http://sinewavegenerators.com/mobile.php)

they owns nearly 100+ DG Sets of capacity ranging from 20 KVA to 1000 KVA out of which 95% are Mobile Acoustics Generator built by Hi-Tech Engineers, Bangalore.

d) Mobile Hospitals (*Mobident*): (http://www.mobident.in/index.php)

Mobile Dental Hospital (MobiDent) is the brain child of Dentist, Dr Devaiah, BDS., MDS (Pedodontics)., Founder of MobiDent (Nouveau Health Care Pvt Ltd), Bangalore and jointly visualized, designed and fabricated by Hi-Tech Engineers, Bangalore

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In Bangalore we have delivered home dental care services to over 1200 homes.

e) **Mobile Kitchens (Restaurant On Wheels):**

Mobile catering is the business of selling prepared food from some sort of vehicle. It is a feature of urban culture in many countries. Mobile catering can be performed using food trucks, trailers, carts and food stands. Many types of foods may be prepared. Mobile catering is also used to provide food to people during times of emergency. (https://en.wikipedia.org/wiki/Mobile_catering)

A catering truck enables a vendor to sell a larger volume than a cart and to reach a larger market. The service is similar; the truck carries a stock of prepared foods that customers can buy. Ice cream vans are a familiar example of a catering truck in Canada, the United States and United Kingdom.

A food truck or mobile kitchen is a modified van with a built-in barbecue grill, deep fryer, or other cooking equipment. It offers more flexibility in the menu since the vendor can prepare food to order as well as fresh foods in advance. A vendor can choose to park the van in one place, as with a cart, or to broaden the business's reach by driving the van to several customer locations.

A variety of industries need mobile kitchens, event kitchens, kitchen equipment and catering equipment. Mobile Kitchen providers normally work with event planners on all types of special events, facilities and project managers on construction and renovations, and with government and private agencies assisting with recovery after disasters. All of kitchen and equipment needs can be provided by Mobile Kitchen Solutions Companies and their partners on rentals.

STUDIES ON THE MECHANICAL AND BIO-CHEMICAL METHODOLOGY IN TREATING THE SPENT LUBRICANTS IN MANUFACTURING INDUSTRIES

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For many industries, cutting fluids or Metal Working Fluids (MWF) are just a consumable- buy at the lowest cost, discard after a specific period of usage, replenish as necessary to make up for spills and leaks. Cutting fluids can make a major impact on machining productivity. Example timing between regrinding and number of parts per tool edge etc. usage of proper cutting fluid will improve productivity, reduce cost and make the manufacturing process cost competitive. The right approach would be to treat the cutting fluids as liquid assets, with attention to how they are stored, monitored, dispensed and replaced in order to reduce the overall cost. Proper monitoring and control of coolant not only improves the work environment but also eliminates rancid coolant and necessary clean up to a greater extent.

Most of the small scale industries dispose the cutting fluids after usage without treating the same. This result in environmental problems like rain water seepage, danger to aquatic living beings, bad odour etc. looking into these effects, and this study on sustainability of green manufacturing is planned. Effective use of technologies such as mechanical, chemical and biological treatments uses various membrane filtrations, enzymes from selective

bacterial and fungal isolated to reduce the physical matter, odour and chemical oxygen demand, there by obtaining non-hazardous disposable fluid.

Present study is arrived at quantifying and developing the above methods for reusability/ disposability of the cutting fluids which may not be followed at present by small and medium scale industries.

Problem areas identified

- Recycling of MWF
- Disposal of MWF

Recycling of MWF:

Recycling is a process to keep coolants at their peak operating condition. Incorporating concentration control, biological control, liquid/solid contamination control, and testing to assure additive control, recycling coolants is the most effective way to ensure optimal performance. Recycling is a method of reducing cutting fluid disposal. Due to the major changes in environmental regulations, recyclability becomes one of the most important fluid properties. Fluid disposal costs exceed the cost of buying new fluids when dilution factors are taken into account. The main aim of recycling is to reduce the fluid usage, elimination of fluid disposal, reduction in fluid related dermatitis and elimination of machine tool rust.

Disposal of MWF

The disposal of MWF has the greatest impact on the environment.MWF disposal results from the breakdown of the product by metal residuals, microorganisms, leak oils and excesses in heat, water hazardous metal carry-off, hazardous chemical constituents, oxygen depletion, oil content and nutrient.

OBJECTIVES OF THE PROJECT

The objectives of the this project study are outlined as

1. To study the existing methods employed to remove metal chips from MWF, evaluate their short falls.
2. To analyse the MWF based on pH and concentration under different usage condition
3. To remove ferrous and non ferrous metal chips using the magnetic filtration unit.
4. To reduce the growth of anaerobic bacteria by fabricating the stirrer unit.
5. To determine the amount of bacterial content in the given MWF using standard methods.
6. To evaluate the type of the bacteria present in the collected sample, thereby eliminating the hazardous bacteria that have a greater impact on the environment and on human health.
7. To determine a technique that needs to be employed to avoid the growth of identified bacteria.

CONSTRUCTION AND WORKING OF STIRRER UNIT

Steel container of 5 liter capacity is used. This container was sterilized to avoid bacterial contamination. In order to stimulate the aerobic characteristic of the Metal Working Fluid, an oxygen pump was installed to the container thereby brings oxygen up to the levels and discourages anaerobic bacteria without affecting the properties of MWF. The main way an air pump adds oxygen is by creating ripples on the water surface.

A stirrer was designed and fabricated for the uniform circulation of oxygen to the entire container. The continuous stirring mechanism was incorporated using a motor which was placed overhead to the container. The stirrer is designed using a 6 mm diameter shaft which is connected to a blower blade. The shaft is operated using a 100 rpm, 12v, dc motor.

Figure: Stirrer Unit

The Metal Working fluid is circulated continuously and held in the reservoir for sufficient period of time that intends the growth of anaerobic bacteria. This results in bacteria, yeast and fungi to be suspended in the MWF.

Figure: Stirrer unit connected to Machine

PURPOSE

During working, the MWF is continuously circulated over the work piece, typically at 5-7 liters / minute and returned to a sump at the base of the machine. The system is open to microbial contamination. The aerobic status of the fluid fluctuates with the circulation regime used. When the fluid is held up in the sump during non working hours like weekends, metal swarf accumulation occurs on the surface of the fluid which leads to anaerobic condition due to stagnant areas. This results in decrease in pH; this in turn leads to the growth of bacteria. In order

to prevent the growth of anaerobic bacteria the stirrer unit was fabricated. The continuous supply of oxygen and stirring action was predicted to reduce the bacterial load.

RESULTS OF USAGE OF STIRRER UNIT AND PLATING BY SERIAL DILUTION TO FIND THE BACTERIAL LOAD

By using the stirrer and oxygen pump which stirs the MWF continuously and also supplies the oxygen, it was predicted that the swarf accumulation on the surface of the MWF when it was stored in the reservoir could be reduced significantly. As predicted, the stirrer unit showed significant results when it was used. The samples which are subjected to serial dilution were analyzed for bacterial count which is represented in CFU/mL (Colony Forming Unit per milliliter).The colonies are formed in a particular color. In the present experiment, the colonies are formed in cream custard color. The normal incubation time is 24 hours. The plate is placed on a black sheet of paper as a background. The colonies are visible to the naked eye. A pen is used to mark on the outside of the plate which is already counted. The amount of sample used varies in each sample, first the total numbers of colonies are counted and they are divided by the milliliters of sample taken, then both numerator and denominator is multiplied by the dilution factor to obtain total number of colonies per milliliter. The following formula is used to determine the bacterial load which is represented in CFU/mL.

(Number of Colonies counted ÷ Amount of sample plated)* (Dilution factor) = CFU/mL.

- **Sample 1: Fresh, Unused condition**

(Number of colonies ÷ amount of sample plated) * (Dilution factor) = CFU/mL

The number of colonies formed for dilution of 10^2 is 532. The plate is divided into 4 parts. Each part consists of 133 colonies. 133 are multiplied to 4 so that approximate numbers of colonies are obtained.

133*4= 532

Therefore,

$(532 ÷ 0.1) * 10^2 = 5.32 * 10^5 \text{CFU/mL}$

- **Sample 2: Used in the machine and stirrer unit for 3 hours**

(Number of colonies ÷ amount of sample plated) * (Dilution factor) = CFU/mL

The number of colonies obtained is 37 in the whole plate for dilution 10^5.

Therefore,

$(37 ÷ 0.1) * 10^5 = 3.7 * 10^7 \text{CFU/mL}$

- **Sample 3: MWF not used for two days in machine and stirrer unit (Saturday, Sunday)**

(Number of colonies ÷ amount of sample plated) * (Dilution factor) = CFU/mL

The number of colonies counted in the whole plate is 36 for dilution 10^4.

Therefore,

$(36 ÷ 0.1) * 10^4 = 3.6 * 10^6 \text{ CFU/mL}$

- **Sample 4: MWF used only in the machine for one week.**

(Number of colonies ÷ amount of sample plated) * (Dilution factor) = CFU/mL

The number of colonies formed for dilution of 10^4 is 220. The plate is divided into 4 parts. Each part consists of 55 colonies. 55 are multiplied to 4 so that approximate numbers of colonies are obtained.

Therefore,

$(220 ÷ 0.1) * 10^5 = 2.2 * 10^8 \text{ CFU/mL}$

- **Sample 5: MWF used in both stirrer and machine for one week.**

(Number of colonies ÷ amount of sample plated) * (Dilution factor) = CFU/mL

The number of colonies counted in the whole plate is 54 for dilution factor 10^5

Therefore,

$(54 ÷ 0.1) * 10^5) = 5.4 * 10^6 \text{ CFU/mL}$

The following table summarizes the result.

Table: Summarization For Results

Sample number	Amount of sample (mL)	Dilution factor	Colonies counted	Bacterial load(CFU/mL)
1	0.1	10^2	532	$5.32*10^5$
2	0.1	10^5	37	$3.7 * 10^7$
3	0.1	10^4	36	$3.6 * 10^6$
4	0.1	10^5	225	$2.2 * 10^8$
5	0.1	10^5	54	$5.4 * 10^6$
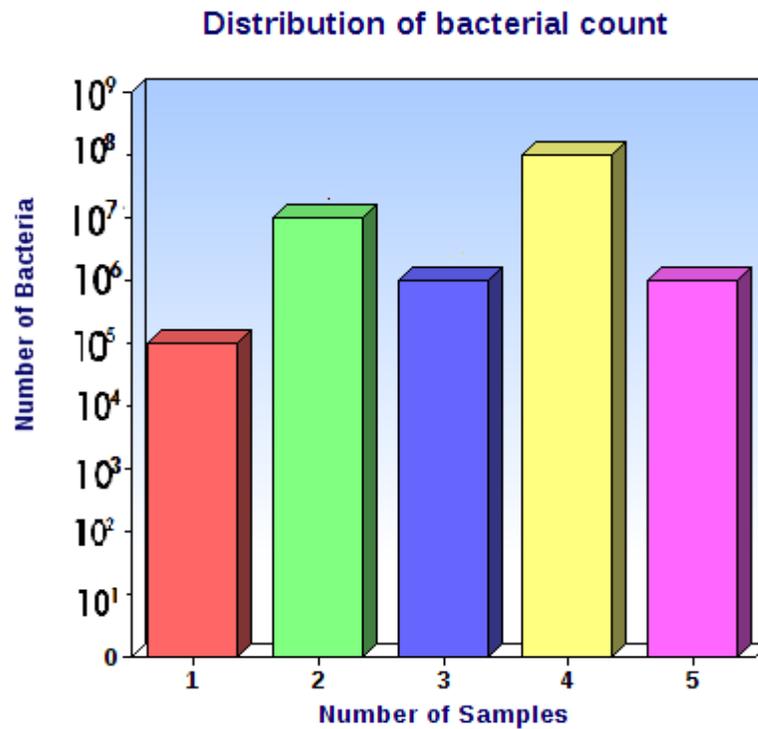
Figure: Graph representing bacterial load(CFU/mL) of different samples

Figure: The photograph of bacterial load for sample 4 and sample 5

Discussions:

From the results obtained, the bacterial load in

- Sample 1, which is fresh, unused condition. The bacterial load is found to be $5.32*10^5$ CFU/mL which shows a significant amount of contamination. The source of contamination can be via the water which is used to dilute the concentrate or the human unhygienic concerns. According to German drinking water regulation (2001) tap water is allowed to contain up to 100 viable bacterial cells per mL.
- Sample 2, bacterial load is $3.7 * 10^7$ CFU/mL which shows an increase in contamination when compared to sample 1. The result obtained is as predicted because it is used in the power hacksaw machine for 3 hours. The contamination is due to the environment exposure and due to the usage of machine. The MWF is contaminated by tramp oil, metal chips, chemical constituents, oil and grease.
- Sample 3, bacterial load is $3.6 * 10^6$ CFU/mL which is lesser than sample 2. The contamination is less due to non-working hours of the machine for two days i.e. Saturday and Sunday. The lessening of contamination is due to the biocide which is already present in the mineral oil (Servocut S).
- Sample 4, bacterial load is highest among the other samples. The bacterial load is $2.2 * 10^8$ CFU/mL which is highly toxic. The sample is exclusively used in the power hacksaw machine for a week. The sample was subjected to various means of contamination like particulates, tramp oil, metal carry off etc which tends to reduce the quality of metal working operations overtime. It also eventually renders the fluid ineffective for metal working operations resulting significant acquisition and disposal costs that reduce profitability.
- Sample 5, bacterial load of $5.4 * 10^6$ CFU/mL which is less than sample 4. The results showed a significant difference when stirrer unit was used. By using the stirrer mechanism there is a successful control and reduction of viable bacterial counts from unprotected control levels of 10^8 to 10^6 (sample 4 and sample 5).Therefore usage of stirrer and oxygen supply is a successful mechanism which controls the bacterial growth.

RESULTS OF GRAM STAINING

The major categories of gram staining are gram positive and gram negative bacteria. In the experiment which was carried out, the gram staining method showed "gram negative bacteria" which is pink in color due to retaining of counter stain dye called safranin. Gram negative bacteria have a thinner layer of peptidoglycan and lose crystal violet iodine complex during decolorization with the alcohol rinse, but retain color stain safranin, thus appearing reddish or pink. They also have an additional outer membrane which contains lipids which is separated by cell wall by means of periplasmic space.
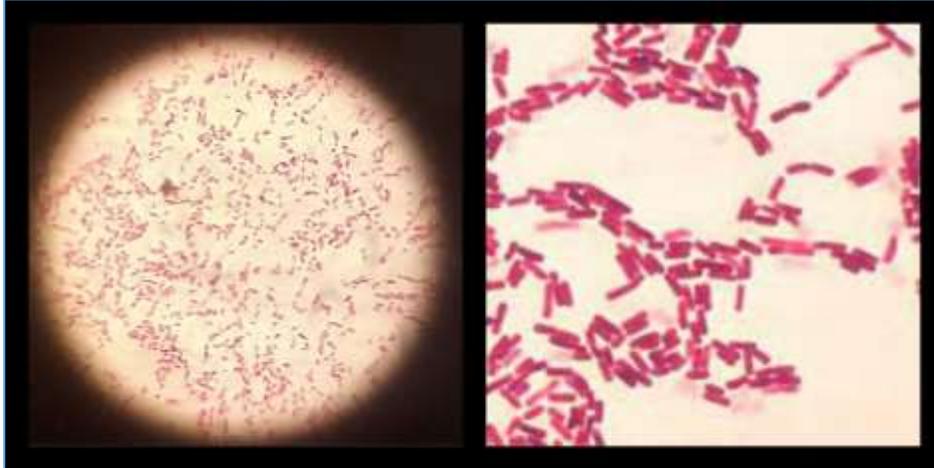
Figure: Microscopic photograph of gram negative bacteria

Discussions:

The cell wall of Gram-negative bacteria is often a virulence factor that enables pathogenic bacteria to cause disease. The virulence of Gram-negative bacteria is often associated with certain components of the cell wall, in particular, the lipopolysaccharide (otherwise known as LPS or endotoxin). In humans, LPS elicits an innate immune response characterized by cytokine production and activation of immune system. Inflammation occurs as a result of cytokine production, which can also produce host toxicity.

RESULTS OF POLYMERASE CHAIN REACTION (PCR)

Sequencing of DNA:

The isolates were subjected to the PCR amplification, using the primers BSF. As expected, a PCR product size 1.5kb was observed. No non specific bands were observed, this amplified product was used for sequencing purpose.

Sequence result for sample 4:

Summary of BLAST search indicating maximum homology to Arthrobacter subterraneus 16S rRNA gene retained from the database is presented below.
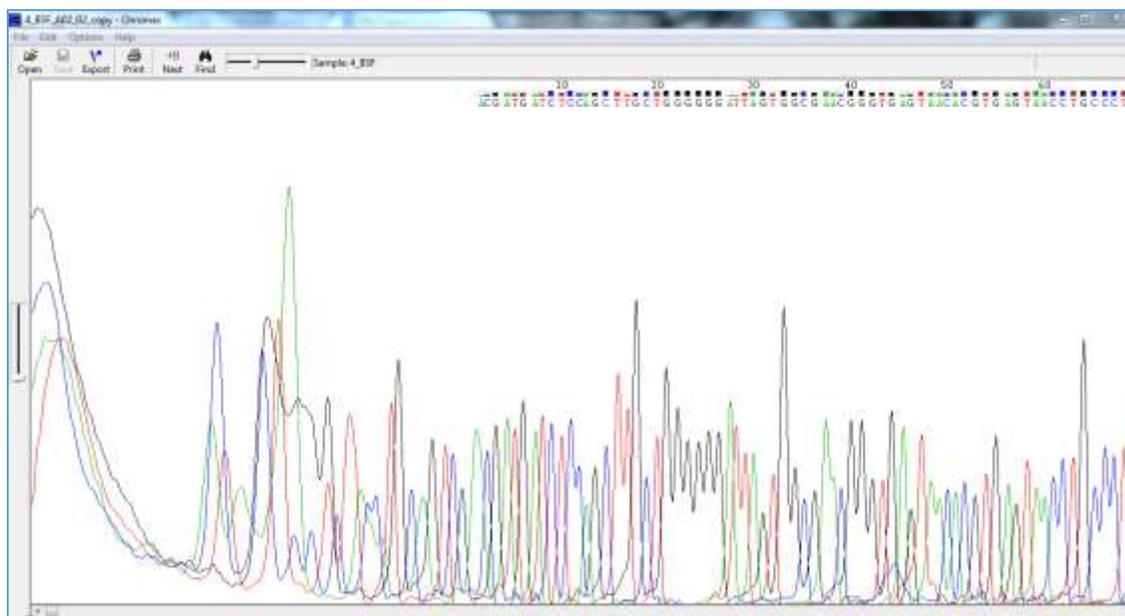
Figure :

Chromatogram Nucleotide sequence obtained from Chromas Biotech (Bangalore, India) for sample 4
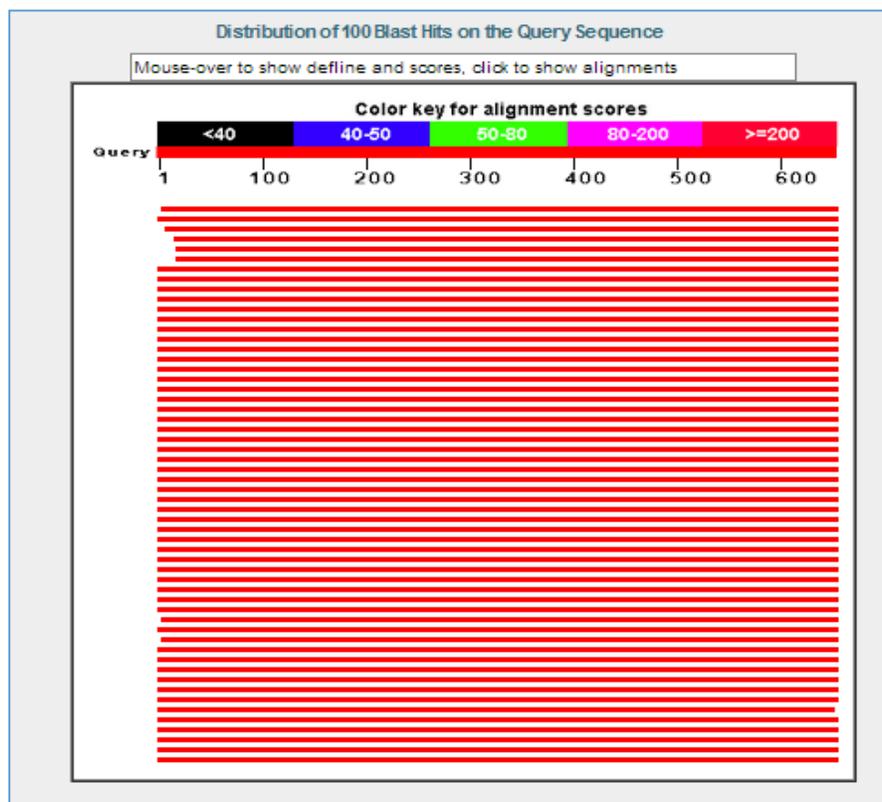

Figure: For 16s rRNA sequence of sample 4 by BLAST

Download   GenBank Graphics

Arthrobacter subterraneus strain UF11 16S ribosomal RNA gene, partial sequence
Sequence ID: gb|KF717524.1| Length: 1357 Number of Matches: 1

Range 1: 1 to 656 GenBank Graphics   Next Match   Previous Match

Score	Expect	Identities	Gaps	Strand
1195 bits(647)	0.0	654/657(99%)	1/657(0%)	Plus/Plus

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Query  4    ATGATCTCCAGCTTGCTGGGGGGGATTAGTGGCGAACGGGTGAGTAACACGTGAGTAACCT  63
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Sbjct  1    ATGATCTCCAGCTTGCTGGGGGGGATTAGTGGCGAACGGGTGAGTAACACGTGAGTAACCT  60

Query  64   GCCCTTGACTCTGGGATAAGCCTGGGAAACTGGGTCTAATACTGGATACGACCTTCTGGC  123
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Sbjct  61   GCCCTTGACTCTGGGATAAGCCTGGGAAACTGGGTCTAATACTGGATACGACCTTCTGGC  120

Query  124  GCATGCCATGTGGGTGGAAAGCTTTTGTGGTTTTGGATGGACTCGCGGCCTATCAGCTTG  183
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Sbjct  121  GCATGCCATGTGGGTGGAAAGCTTTTGTGGTTTTGGATGGACTCGCGGCCTATCAGCTTG  180

Query  184  TTGGTGGGGTAATGGCCTACCAAGGCGACGACGGGTAGCCGGCCTGAGAGGGTGGACGGC  243
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Query  244  CACACTGGGACTGAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCA  303
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Sbjct  241  CACACTGGGACTGAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCA  300

Query  304  CAATGGGCGCAAGCCTGATGCAGCGACGCCGCGTGAGGGATGAAGGCCTTCGGGTTGTAA  363
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Query  424  TACGTGCCAGCAGCCGCGGTAAGACGTAGGGCGCAAGCGTTATCCGGAATTATTGGGCGT  483
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Query  484  AAAGAGCTCGTAGGCGGTTTGTCGCGTCTGCCGTGAAAGTCCGGGGCTTAACTCCGGATC  543
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Sbjct  481  AAAGAGCTCGTAGGCGGTTTGTCGCGTCTGCCGTGAAAGTCCGGGGCTTAACTCCGGATC  540

Query  544  TGCGGTGGGTACGGGCAGACTTGAGTGATGTAGGGGAGACTGGAATTCCTGGTGTAGCGG  603
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Sbjct  541  TGCGGTGGGTACGGGCAGACTTGAGTGATGTAGGGGAGACTGGAATTCCTGGTGTAGCGG  600

Query  604  TGAAATGCGCAGATATCAGGAGGAACACCGATGGGCGAAGGCAGGTCTCTGGGCATT  660
            ||||||||||||||||||||||||||||||||||| ||||||||||||||||||||||
Sbjct  601  TGAAATGCGCAGATATCAGGAGGAACACCGAT-GGCGAAGGCAGGTCTCTGGGCATT  656
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Figure: Representative sequence alignment of nucleotide detection of culture (sample 4)

Sequences producing significant alignments:
Select: All None Selected 0

Description	Max score	Total score	Query cover	E value	Ident	Accession
Arthrobacter subterraneus strain UF11 16S ribosomal RNA gene, partial sequence	1195	1195	99%	0.0	99%	KF717524.1
Arthrobacter subterraneus strain UF12 16S ribosomal RNA gene, partial sequence	1184	1184	100%	0.0	99%	KF717525.1
Arthrobacter subterraneus strain MF04 16S ribosomal RNA gene, partial sequence	1182	1182	98%	0.0	99%	KF717502.1
Arthrobacter sp. SO4-4 partial 16S rRNA gene, isolate SO4-4	1175	1175	97%	0.0	99%	FR750290.1
Arthrobacter subterraneus strain UF13 16S ribosomal RNA gene, partial sequence	1170	1170	97%	0.0	99%	KF717526.1
Arthrobacter subterraneus strain UF10 16S ribosomal RNA gene, partial sequence	1170	1170	97%	0.0	99%	KF717523.1
Uncultured bacterium clone PR26 16S ribosomal RNA gene, partial sequence	1168	1168	100%	0.0	99%	DQ298281.1
Arthrobacter subterraneus strain M1405 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	HF824210.1
Arthrobacter sp. 5_71 partial 16S rRNA gene, strain 5_71	1162	1162	100%	0.0	98%	HF954452.1
Uncultured bacterium clone AZ-72 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	KC554794.1
Bacterium BW4PhS21 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	KC012898.1
Bacterium ypvta369fc523cnp10 bdc 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	JX953388.1
Arthrobacter subterraneus strain 83F 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	JQ804637.1
Arthrobacter sp. FO-NAM2 partial 16S rRNA gene, strain FO-NAM2	1162	1162	100%	0.0	98%	FR716536.1
Arthrobacter sp. FO-NAM1 partial 16S rRNA gene, strain FO-NAM1	1162	1162	100%	0.0	98%	FR716535.1
Arthrobacter sp. BT3 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	JN377560.1
Uncultured bacterium partial 16S rRNA gene, isolate d21t12b12	1162	1162	100%	0.0	98%	FR687137.1
Agrococcus sp. gh5 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	HM151740.1
Arthrobacter sp. MJ431 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	GU933496.1
Uncultured bacterium clone P5-mS48-E1 16S ribosomal RNA gene, partial sequence	1162	1162	100%	0.0	98%	GU574025.1

Figure: Sequence producing significant alignments for sample 4

Table: Details of the alignment obtained for sample 4

Strain	Max score	E-value	Identity	Accession number
Arthrobacter subterraneus strain UF11 16S ribosomal RNA gene, partial sequence	1195	0.0	99%	KF717524.1
Arthrobacter subterraneus strain UF12 16S ribosomal RNA gene,partial sequence	1184	0.0	99%	KF717525.1
Arthrobacter subterraneus MP04 16S ribosomal RNA gene,partial sequence	1182	0.0	99%	KF717502.1
Arthrobacter sp. S06-4 partial 16S rRNA gene,isoloateS06-4	1175	0.0	99%	FR750290.1

RESULT: Identity for sample 4 shows 98% identity and a maximum score of 1195 to Arthrobacter subterraneus.

Arthrobacter species were identified as the causative agent of diseases. In particular, *arthrobact*er was determined to be the cause of infective endocardins (inflammation of the inner layer of the heart). Arthrobacter is the most common encountered strain, but it is difficult to identify and therefore may be under-diagonised (Funke et al, 1998)

Table: Scientific classification of Arthrobacter subterraneus

Kingdom	Bacteria
Phylum	Actinobacteria
Order	Actinomycetales
Family	Micrococcaceae
Genus	Arthrobacter
Species	Arthrobacter subterraneus

Sequence result for sample 5:
Summary of BLAST search indicating maximum homology to Bacillus megaterium 16s rRNA gene retained from the database is presented below.

Figure: Chromatogram Nucleotide sequence obtained from Chromas Biotech (Bangalore, India) for sample 5
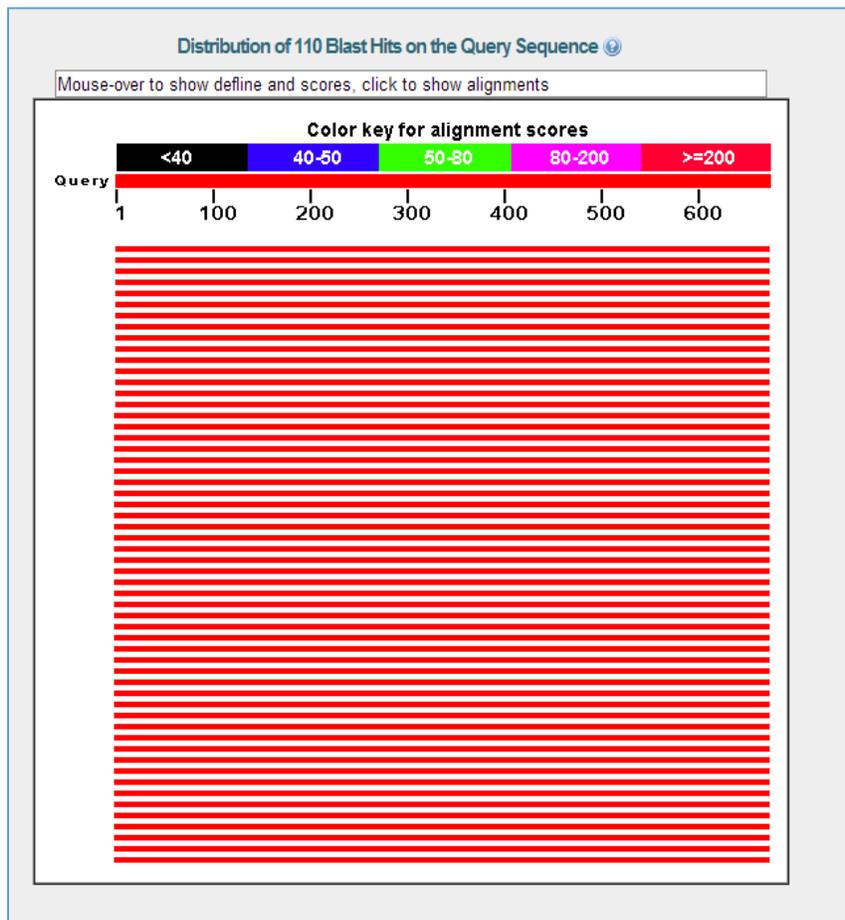
Figure: 16S rRNA sequence of sample 4 culture by BLAST

Bacillus megaterium strain TSB16 16S ribosomal RNA gene, partial sequence
Sequence ID: gb|KF364492.1| Length: 1416 Number of Matches: 1

Range 1: 5 to 677 GenBank Graphics   ▼ Next Match ▲ Previous Match

Score	Expect	Identities	Gaps	Strand
1195 bits(647)	0.0	665/673(99%)	4/673(0%)	Plus/Plus

```
Query  3    AGTCGAGCGAACTGATTAGAAGCTTGCTTCTATGACGTTAGCGGCGGACGGGTGAGTAAC  62
            ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
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Query  63   ACGTGGGCAACCTGCCTGTAAGACTGGGATAACTTCGGGAAACCGAAGCTAATACCGGAT  122
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Query  123  AGGATCTTCTCCTTCATGGGAGATGATTGAAAGATGGTTTCGGCTATCACTTACAGATGG  182
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Query  183  GCCCGCGGTGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGGCAACGATGCATAGCC  242
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Sbjct  185  GCCCGCGGTGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGGCAACGATGCATAGCC  244

Query  243  GACCTGAGAGGGTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACGGGAGG  302
            ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Sbjct  245  GACCTGAGAGGGTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACGGGAGG  304

Query  303  CAGCAGTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGA  362
            ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Sbjct  305  CAGCAGTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGA  364

Query  363  TGAAGGCTTTCGGGTCGTAAAACTCTGTTGTTAGGGAAGAACAAGTATGAGAGTAACTGC  422
            ||||||||||||||||||||||||||||||||||||||||| |||||||| |||||||||
Sbjct  365  TGAAGGCTTTCGGGTCGTAAAACTCTGTTGTTAGGGAAGAACAAGTACGAGAGTAACTGC  424

Query  423  TCGTACCTTGACGGTACCTAACCTGAG-GCCACGGCTAACTACGTGCCAGCAGCCGCGGT  481
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Sbjct  425  TCGTACCTTGACGGTACCTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGT  484

Query  482  AATACGTAGG-GGCAAGCGTTATCCGGAATTATTGGGCGTAAAGCGCGCGCAGGCGGTTT  540
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Sbjct  485  AATACGTAGGTGGCAAGCGTTATCCGGAATTATTGGGCGTAAAGCGCGCGCAGGCGGTTT  544

Query  541  CTTAAGTCTGATGTG-AAGCCCACGGCTCAACCGTGGAGGGTCATTGGAAACTGGGGGAA  599
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Query  600  CTTGAGTGCAGAAGAGAAAAGCGG-ATTCCACGTGTAGCGGTGGAATGCGTAGAGATGTG  658
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Sbjct  605  CTTGAGTGCAGAAGAGAAAAGCGGAATTCCACGTGTAGCGGTGAAATGCGTAGAGATGTG  664

Query  659  GAGGAACACCAGT  671
            |||||||||||||
Sbjct  665  GAGGAACACCAGT  677
```

Figure: Representative sequence alignment of nucleotide detection of culture (sample 4).

Figure: Sequence producing significant alignments for culture 5

Table 6.4: Bacteria identification for sample 5

Strain	Max score	E-value	Identity	Accession number
Bacillus megaterium TSB16 16S ribosomal RNA gene, partial sequence	1195	0.0	99%	KF364492.1
Bacillus sp.2059 16S ribosomal RNA gene, partial sequencing	1195	0.0	99%	KC236510.1
Ground water biofilm bacterium W1 16S ribosomal RNA gene, partial sequencing	1195	0.0	99%	FJ204439.1
Bacillus megaterium strain SAFR-011 16S ribosomal RNA gene , partialsequence.	1195	0.0	99%	AY167862.1

RESULT: Identity for sample 4 shows 99% and a maximum score of 1195 to Bacillus megaterium.

Table : Scientific classification of Bacillus megaterium

Phylum	Firmicutes
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	Bacillus
Species	B.megaterium Binomial name Bacillus megaterium De Bury 1884
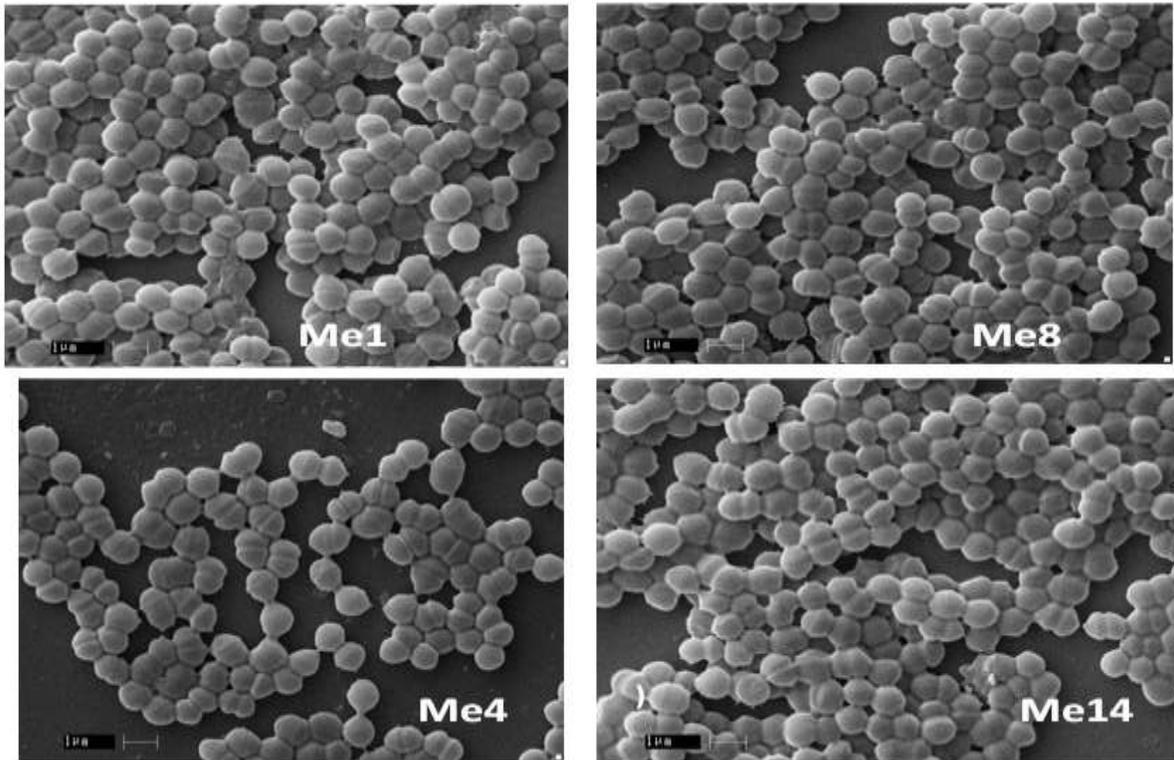
Figure: SEM (Scanning Electron Microscope) images of sample 4 and sample 5

Discussion

From the results obtained, the pathogenic bacteria are identified as Arthrobacter subterraneus and Bacillus megaterium which is toxic in nature. From the data obtained, the E-value, an "expect value" that estimates how many matches would have occurred at a given score by chance, which can aid a user in judging how much confidence to have in an alignment. The E-value gives an indication of the statistical significance of a given pair wise alignment and reflects the size of the database and the scoring system used. The lower the E-value, more significant the alignment is. The Identity is the extent to which two nucleotide sequences have the same residues

at the same positions in an alignment, often expressed as a percentage (Fassler and Cooper, 2011). The accession number is a unique identification code given to a DNA sequence by GenBank. Data related to the sequence can be retrieved by users, with the help of the accession number.

RESULTS OF ANTIBIOTIC SUSCEPTIBILITY TEST

Sample 4:

The results for antibiotic susceptibility test showed positive results for Erthromycin (E), Penicillin solution and Thryomycin. Among the three, penicillin solution showed maximum inhibition zone.
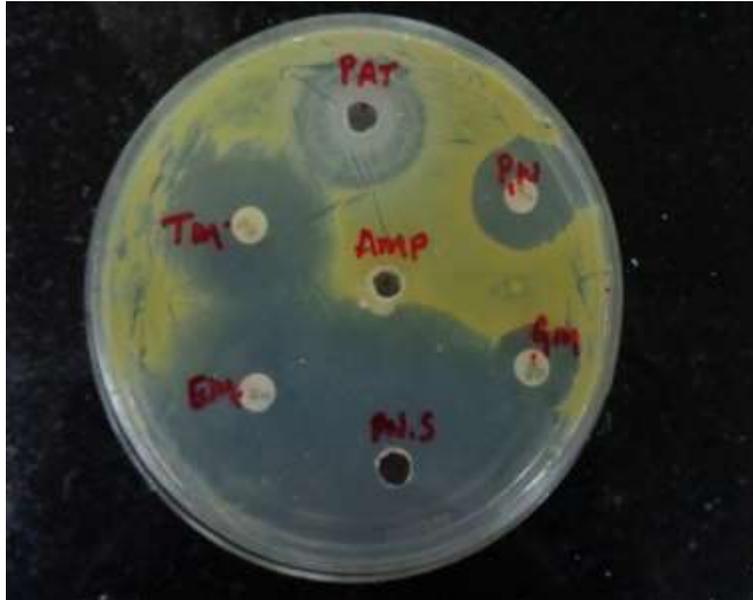
Figure: Penicillin solution (PN.S) shows maximum inhibition.

Sample 5:

The results for antibiotic susceptibility test showed positive results for Penicillin solution and Thryomycin. Among the two, penicillin solution showed maximum inhibition zone.
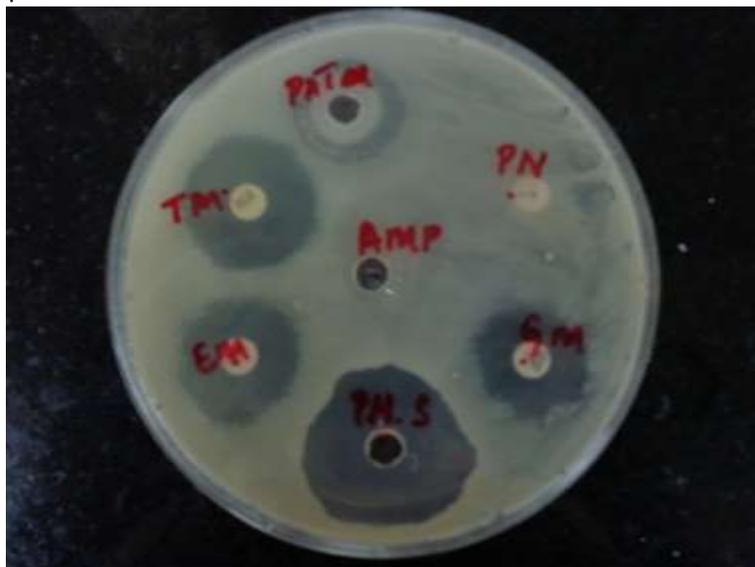
Figure: Penicillin solution (PN.S) shows maximum inhibition.

Discussions:

The Kirby Bauer test for antibiotic susceptibility test showed significant results for both the samples. The antibiotics/chemicals diffused outward from the disks into the agar. The absence of growth of the organism around the antibiotic disks indicated that the pathogenic bacteria which were found by gene sequencing- Arthrobacter subterraneus and Bacillus megaterium were susceptible to penicillin solution and the presence of growth around the solution indicated that the organism is resistant to penicillin solution antibiotic in particular.
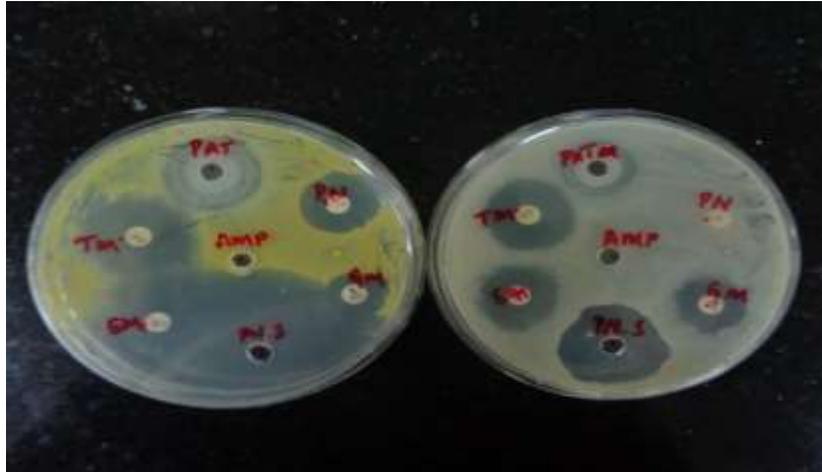
Figure: An overview of two cultures for which penicillin shows maximum inhibition zone.

CONCLUSION:

Metal Working fluids perform a variety of functions that make them essential to the metal products manufacturing industry. However, MWFs also have inherent environmental and health liabilities associated with them that are a concern to the industry. These liabilities can be viewed as an opportunity to re-evaluate the functionality of MWFs and improve profitability of operations. Improving environmental performance and profitability simultaneously will require informed process planning, novel process modifications and more aggressive efforts at in-process recycling. A Combined reduce/reuse strategy will benefit improved MWF quality.

In the present work it is investigated that MWF is most readily degraded by micro-organisms and metal contaminants that are relatively resistant to bio-degradation. Magnetic filter was constructed to remove ferrous and non ferrous metals which resulted in the reduction of metal contaminants in the MWF. Stirrer unit was fabricated with an integrated oxygen supplier that resulted in the reduction of bacterial load. Various samples of microbial community colonizing an MWF emulsion, during its lifetime under in-use condition used in CNC Lathe machine and a fabricated stirrer unit was analyzed to find out the bacterial load by plating method. The toxicity of the bacteria was detected by gram staining method. The pathogenic bacteria were identified by PCR (Polymerase chain reaction), amplifying the DNA strands and bio-informatics tools were used. Shifts in the composition of microbial load were related to chemical composition changes in MWF emulsion over time.

The bacterias were identified as Anthrobacter subterraneus and Bacillus megaterium. In addition, MWF samples were analyzed for antibiotics by antibiotic susceptibility test using filter paper discs. The antibiotic for the detected bacteria was identified as pencillin. As a conclusion; pencillin can be used in MWF before using in the machine so that bacterial contamination will be completely eliminated and the MWF can be reused.

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STUDIES ON CAPACITY IMPROVEMENT OF SOLAR UPDRAFT TOWER

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Corresponding Author

The solar updraft tower is a renewable-energy power plant for generating electricity from solar power. Sunshine heats the air beneath a very wide greenhouse-like roofed collector structure surrounding the central base of a very tall chimney tower. The resulting convection causes a hot air updraft in the tower by the chimney effect. This airflow drives wind turbines placed in the chimney updraft or around the chimney base to produce electricity

The main objective of the project is to study and investigate the influence of tower cross-sectional area changes on the performance of a solar tower power plant using computational fluid dynamics. Optimization of solar chimney outlet diameter is carried out to determine the effects of tower profile, the solar tower models with several tower inlet and outlet area ratios

A solar tower system with varying tower flow area has been studied and its performance was evaluated. The results showed that divergent tower helps increase mass flow rate and kinetic energy over that of the constant area tower. The tower area ratio of 9 can produce kinetic energy as much as 94 times that of the constant area tower. For the convergent tower, the velocity at the top increases but the mass flow rate decreases in a manner such that the kinetic power at the top remains the same as the constant area case. For the divergent case, maximum kinetic energy occurs at the tower base and this suggests the potential to extract more turbine power than the constant area tower.

Fig: Solar Updraft Tower

INTRODUCTION:

Schlaich [1] insisted on urgent action regarding global problems such as energy demand, rapid population growth and pollution by the utilization of large scale solar energy generation. He endorsed the use of solar chimney power plants for future electricity generation. Schlaich also gave details of construction, construction materials, operation, tests and experimental data of the pilot solar chimney plant in Manzanares. Based on the experience gained from the experimental plant, rough investment and energy generation cost calculations are presented for developing large scale solar chimney power plants.

OBJECTIVE:

➢ The present study investigates the influence of tower cross-sectional area changes on the performance of a solar tower power plant.

➢ The commercial CFD code "CFX" has been proven to be a reliable tool to simulate the flow in solar tower.

➢ To determine the effects of tower profile, the solar tower models with several tower inlet and outlet area ratios were specified and solved by CFX. Optimization of solar chimney outlet diameter is also carried out.

METHODOLOGY:

The solar updraft tower is a renewable-energy power plant for generating electricity from solar power. Sunshine heats the air beneath a very wide greenhouse-like roofed collector structure surrounding the central base of a very tall chimney tower. The resulting convection causes a hot air updraft in the tower by the chimney effect. This airflow drives wind turbines placed in the chimney updraft or around the chimney base to produce electricity. Plans for scaled-up versions of demonstration models will allow significant power generation.

MATERIALS USED:

1) Collector Base

➢ Material used- Mild steel
➢ Diameter of the circular base – 700 mm
➢ Support structure nozzles – 150 mm x 50 mm

2) Collector Glass

The collector glass is made of a 4mm thick circular glass of diameter 690 mm. The clearance of 10 mm between the collector base and glass is given in order to facilitate for support structure for cushioning

3) Updraft chimney

➢ Material used- Poly Vinyl Chloride (PVC)
➢ Diameter- 100 mm
➢ Height- 1000 mm

4) Fan (turbine)

The fan used as the rotating element in the updraft tower is a D.C. fan which can be used to store energy and generate low voltage power.

Complete Assembled Model

METHOD: CFD Analysis

The study was carried out to evaluate the effect of varying outlet area of the tower on the performance.

Ratio of tower output area to tower input area (AR) and dimensions of plant models

Case	AR	Tower height (m)	Roof / collector height (m)	Roof / collector radius (m)	Tower inlet radius (m)	Tower outlet radius (m)
Prototype	1	100	2	100	4	4
Model 1	0.5	100	2	100	4	2.83
Model 2	0.75	100	2	100	4	3.46
Model 3	2	100	2	100	4	5.66
Model 4	4	100	2	100	4	8
Model 5	9	100	2	100	4	12
Model 6	16	100	2	100	4	16

1) Modeling;
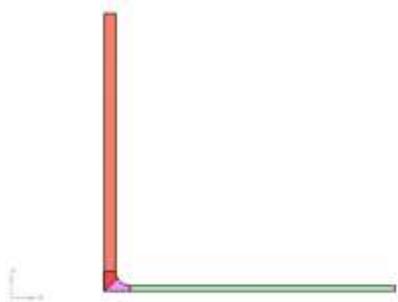
CFD Model of Solar chimney for AR=1   CFD Model of Solar chimney sector 1°-Isometric View
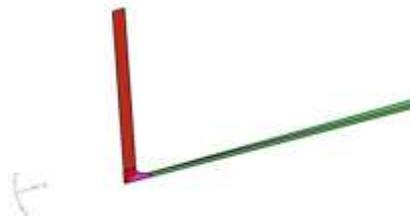
2) Meshing;
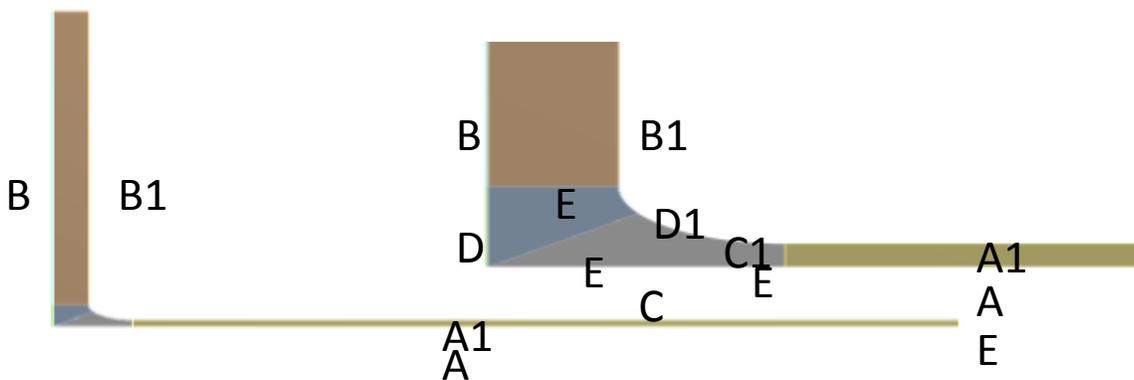
Shows the number of elements used in different grids

	No of elements				
Sides	Grid 1	Grid 2	Grid3	Grid4	Grid5
A, A1	50	100	150	200	250
B,B1	50	100	150	200	250
C, C1	5	10	15	20	25
D,D1	5	10	15	20	25
E	5	10	15	20	25
Total No of elements	605	2310	5115	9020	14025

Grid 1

Grid 2
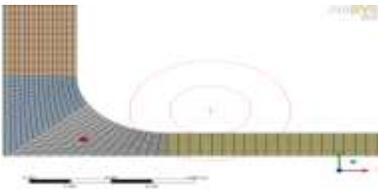
Grid 3
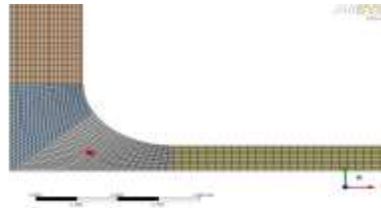
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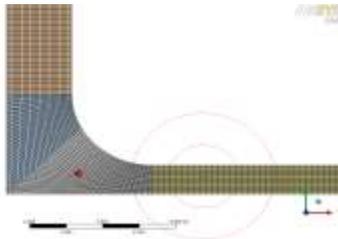
Grid 5

3) Boundary conditions

Proper boundary conditions are needed for a successful computational work. At the roof inlet, the total pressure and temperature are specified as 1000Pa and 300ºK; whereas at the tower exit the 'outlet' condition with zero static pressure is prescribed and heat flux is 800 W/m².

<center>**RESULTS AND CONCLUSIONS:**</center>

1) Velocity contours

From the figures below it is observed that at any AR, the velocity increases as it approaches the tower base. In the tower portion, the velocity distribution depends on AR. For models with AR smaller than one, the

velocity keeps on increasing and attains the maximum value at tower outlet. On the other hand, for models with AR larger than one, the flow achieves its maximum velocity right after entering the tower, and then decreases continuously afterward.
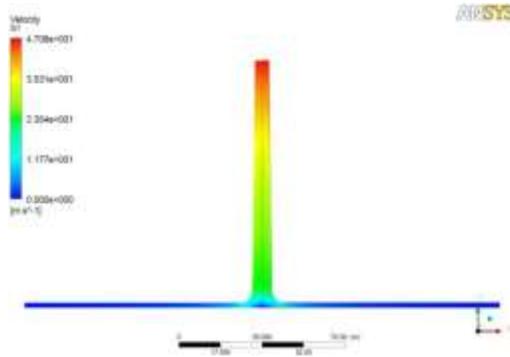
Contours of Velocity at Mid plane for AR=0.5
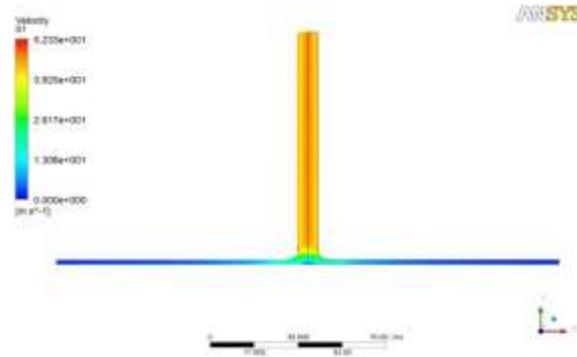
Contours of Velocity at Mid plane for AR=1
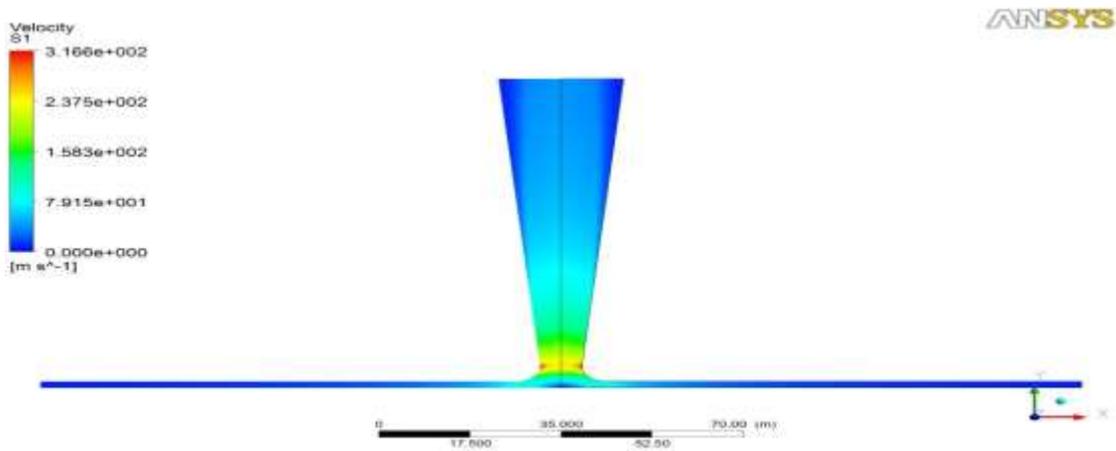
Contours of Velocity at Mid plane for AR=9

The high velocity regions in the figures above are shown by red colour and low velocity by blue colour.The abscissa of all plots shown below is the scaled flow path, equalling zero at roof inlet, one at tower top and 0.5 at tower base.

2) Contours of Temperature

From the following figures it is observed that temperature increases along the flow path in the collector roof region and remain relatively constant along the tower. The high temperature regions in the figures are
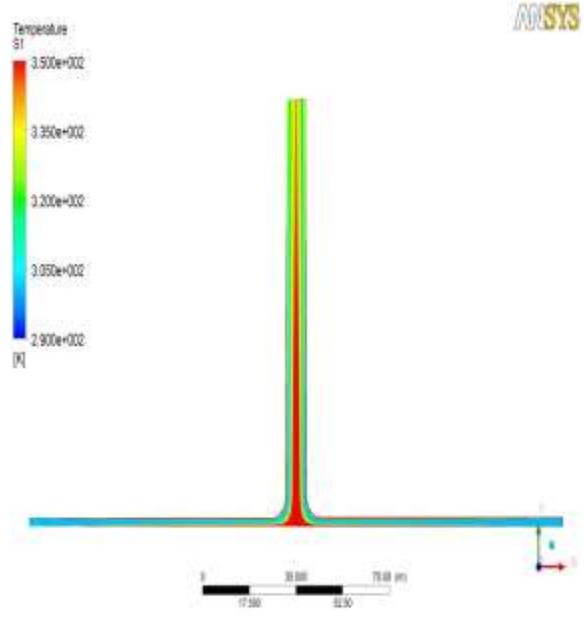
shown by red colour and low temperature by blue colour.
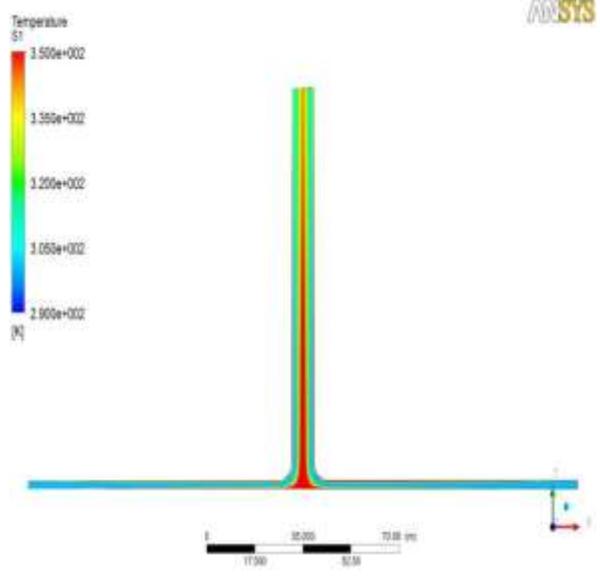
Contours of Temperature at Mid plane for AR=0.5   **Contours of Temperature at Mid plane for AR=1**
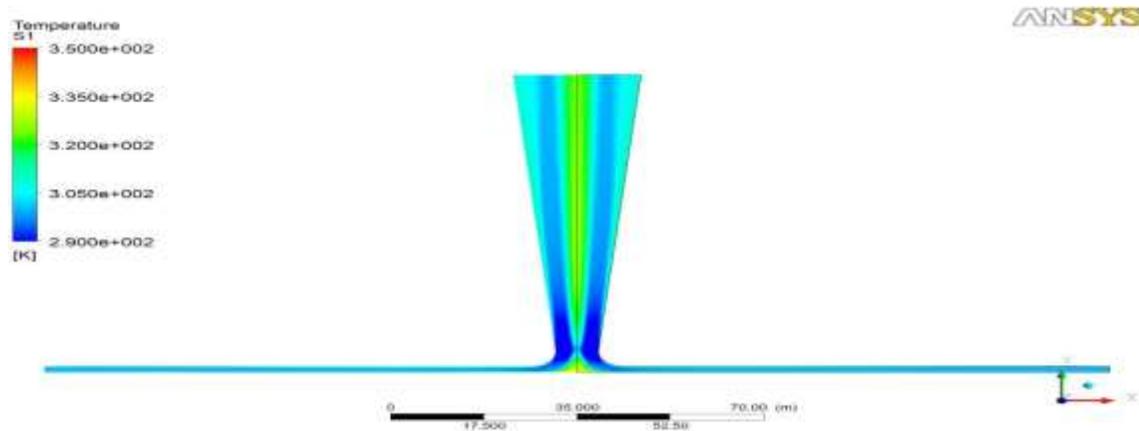
Contours of Temperature at Mid plane for AR=9

Rise of the temperature at the tower base is the response to the abrupt velocity change, in accordance with the conservation of energy principle. The high temperature region in the figure is shown by red colour and low temperature by blue colour. The noted feature is that the temperature levels in each AR case are widely different, being lower in higher AR cases, this is consistent with the differences in mass flow rates of the various cases as presented in fig since a higher mass flow rate should give a lower temperature rise for an equal amount of energy input.

Power ratio

$$\eta = 0.5\dot{m}v_3^2/\dot{Q}A_r$$

Power Ratio and Efficiency at tower entrance

Case	AR	Power ratio	AR²	Efficiency
Prototype	1	1	1	0.002674
Model 1	0.5	0.13	0.25	0.000348
Model 2	0.75	0.4	0.5625	0.00107
Model 3	2	6.98	4	0.18663
Model 4	4	40.02	16	0.107005
Model 5	9	93.38	81	0.249679
Model 6	16	74.88	256	0.2002124
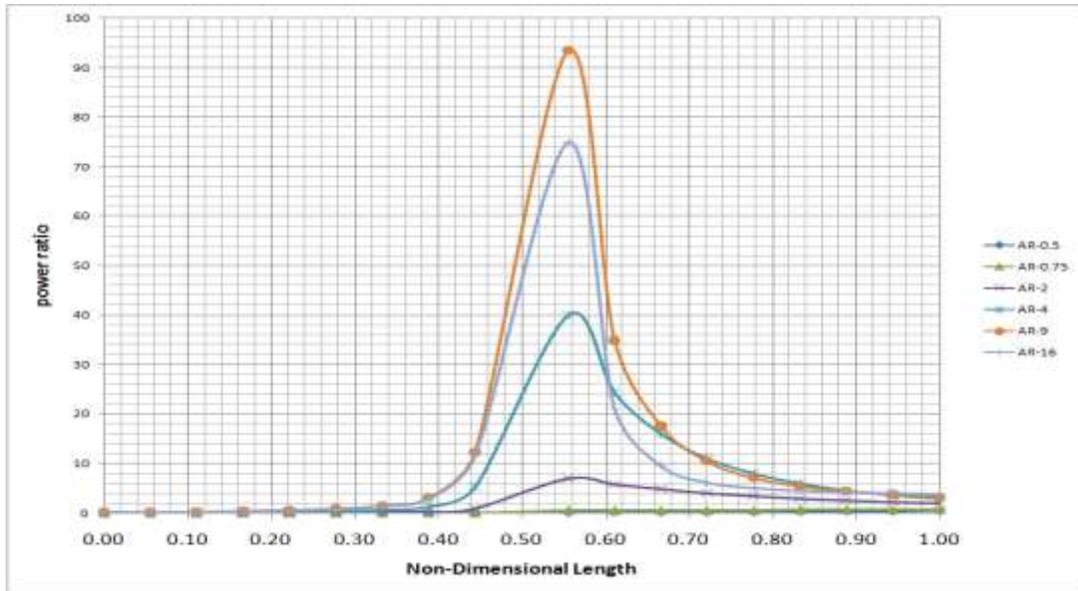
Effect of tower area ratio on the flow power from roof inlet to tower outlet

As shown in Table the efficiency in converting insolation into kinetic energy is rather low, due mainly to the 'shortness' of the tower height. But the increase for the AR=9 case over that of the prototype is quite large, at almost 94 folds. It would seem that there is an upper bound on AR that can boost up the kinetic energy. Too high AR would eventually lead to boundary layer separation. Friction that comes with high velocity would also reduce the benefit.

CONCLUSION

➢ A solar tower system with varying tower flow area has been studied and its performance has been evaluated.
➢ The results show that divergent tower helps increase mass flow rate and kinetic energy over that of the constant area tower.
➢ The tower area ratio of 9 can produce kinetic energy as much as 94 times that of the constant area tower.
➢ For the convergent tower, the velocity at the top increases but the mass flow rate decreases in a manner such that the kinetic power at the top remains the same as the constant area case.
➢ For the divergent case, maximum kinetic energy occurs at the tower base and this suggests the potential to extract more turbine power than the constant area tower.

SCOPE FOR FUTURE WORK

➢ In the present work, potential of the solar chimney is evaluated without considering the turbine in order to reduce the complexity.

➢ For the complete analysis of solar chimney turbine effect should also be considered but it might be difficult to carry out the Numerical simulations on the solar chimney power plant systems coupled with collector, chimney and turbine.

➢ The objective of the work is to determine the shape effect of tower and hence the height and inlet area of tower were fixed and the outlet area was varied.

➢ The plant can also be studied for different chimney heights.

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SOLAR STILL

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Distillation is one of many processes that can be used for water purification. This requires an energy input as heat, electricity and solar radiation can be the source of energy. When Solar energy is used for this purpose, it is known as Solar water Distillation. Solar Distillation is an attractive process to produce portable water using free of cost solar energy. This energy is used directly for evaporating water inside a device usually termed a "Solar Still". Solar stills are used in cases where rain, piped, or well water is impractical, such as in remote homes or during power outages. Different versions of a still are used to desalinate seawater, in desert survival kits and for home water Purification. For people concerned about the quality of their municipally-supplied drinking water and unhappy with other methods of additional purification available to them, solar distillation of tap water or brackish groundwater can be a pleasant, energy- efficient option. Solar Distillation is an attractive alternative because of its simple technology, non-requirement of highly skilled labor for maintenance work and low energy consumption.

The use of solar thermal energy in seawater desalination applications has so far been restricted to small-scale systems in rural areas. The reason for this has mainly been explained by the relatively low productivity rate compared to the high capital cost. However, the coming shortage in fossil fuel supply and the growing need for fresh water in order to support increasing water and irrigation needs, have motivated further development of water desalination and purification by renewable energies. The objective of this project is to design a water distillation system that can purify water from nearly any source, a system that is relatively cheap, portable, and depends only on renewable solar energy.

Fig: Solar Still

OBJECTIVES FOR AN EFFICIENT SOLAR STILL:

For high efficiency the solar still should maintain

➢ A high feed (undistilled) water temperature
➢ A large temperature difference between feed water and condensing surface
➢ Low vapour leakage.

A high feed water temperature can be achieved if:

➢ A high proportion of incoming radiation is absorbed by the feed water as heat. Hence
   Low absorption glazing and a good radiation absorbing surface are required
➢ Heat losses from the floor and walls are kept low
➢ The water is shallow so there is not so much to heat.

A large temperature difference can be achieved if:

➢ The condensing surface absorbs little or none of the incoming radiation
➢ Condensing water dissipates heat which must be removed rapidly from the
   Condensing surface.

PROBLEM STATEMENT:
   Human beings need 1 or 2 liters of water a day to live. The minimum requirement for normal life in developing countries (which includes cooking, cleaning and washing clothes) is 20 liters per day (in the industrialized world 200 to 400 liters per day is typical). Yet some functions can be performed with salty water and a typical requirement for distilled water is 5 liters per person per day.

   Solar stills should normally only be considered for removal of dissolved salts from water. If there is a choice between brackish ground water and polluted surface water, it will usually be cheaper to use a slow sand filter or other treatment device. If there is no fresh water then the main alternatives are desalination, transportation and rainwater collection.
Unlike other techniques of desalination, solar stills are more attractive, the smaller the required output. The initial capital cost of stills is roughly proportional to capacity, whereas other methods have significant economies of scale. For the individual household, therefore, the solar still is most economic. For outputs of 1m³/day or more, reverse osmosis or electro dialysis should be considered as an alternative to solar stills. Much will depend on the availability and price of electrical power. Solar distillation Practical Action for outputs of 200m³/day or more, vapour compression or flash evaporation will normally be least cost. The latter technology can have part of its energy requirement met by solar water heaters.
In many parts of the world, fresh water is transported from another region or location by boat, train, truck or pipeline. The cost of water transported by vehicles is typically of the same order of magnitude as that produced by solar stills. A pipeline may be less expensive for very large quantities.
Rainwater collection is an even simpler technique than solar distillation in areas where rain is not scarce, but requires a greater area and usually a larger storage tank.

 Methodology:
Wick type, W shape and L shape of solar stills were designed on the basis of solar declination angle, slope of collector and available insolation. During theoretical design calculations of solar still (Plate 1), peak winter season was considered. In winter season, December month was selected for finding the solar declination angle (δ), Slope of collector (β), intensity of insolation on horizontal and vertical surface and value of Cos θ is shown in Table 1. The newly developed solar stills were evaluated for load test and compared with the output of single and double slope solar still available in market.
CAD MODEL OF SOLAR STILL:

MODELLING:

Modeling is the process of producing a model; a model is a representation of the construction and working of some system of interest. A model is similar to but simpler than the system it represents. One purpose of a model is to enable the analyst to predict the effect of changes to the system. On the one hand, a model should be a close approximation to the real system and incorporate most of its salient features. On the other hand, it should not be so complex that it is impossible to understand and experiment with it. A good model is a judicious tradeoff between realism and simplicity. Simulation practitioners recommend increasing the complexity of a model iteratively. An important issue in modeling is model validity. Model validation techniques include simulating the model under known input conditions and comparing model output with system output.

Fig: Isometric view

Fig: Over view
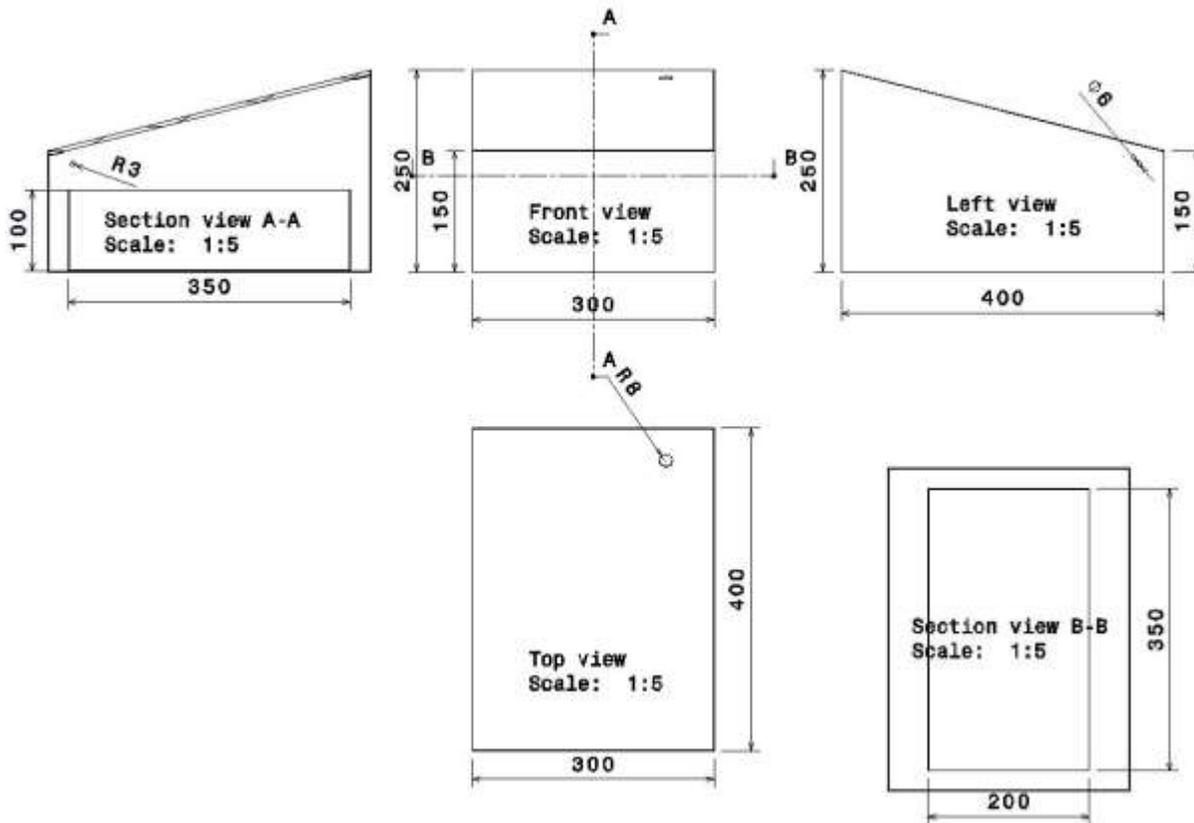
Fig : CAD model drafting

CONCLUSION

Distillation is a method where water is removed from the contaminations rather than to remove contaminants from the water. Solar energy is a promising source to achieve this. This is due to various advantages involved in solar distillation. The Solar distillation involves zero maintenance cost and no energy costs as it involves only solar energy which is free of cost.

It was found from the experimental analysis that increasing the ambient temperature from 32°C to 47°C will increase the productivity by approx. 12 to 23%, which shows that the system performed more distillation at higher ambient temperatures. When inverted type absorber plate was used thermal efficiency of single slope solar still was increased by 7 %.

It was observed that when the water depth increases from 0.01m to 0.03m the productivity decreased by 5%.These results show that the water mass (water depth) has an intense effect on the distillate output of the solar still system.

Solar still productivity can also increase by use of reflector by 3%. The use of the mirror reflector will increase the temperature of the solar still basin; such an increase in the temperature is because of the improvement in solar radiation concentration.

The solar radiation increase from 0 MJ/m2 /h to 6 MJ/m2 /h has increased the productivity of the still by 15 to 32%. However the increase of the solar radiation parameter will increase the solar energy absorbed by the basin liner.

The main disadvantage of this solar still is the low productivity or high capital cost per unit output of distillate. This could be improved by a number of actions, e.g. injecting black dye in the seawater, using internal and external mirror, using wick, reducing heat conduction through basin walls and top cover or reusing the latent heat emitted from the condensing vapour on the glass cover. Capital cost can be reduced by using different designs and new materials for construction of solar stills.

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# GLASS CLEANING AUTOMATED ROBOT FOR HIGH RISE BUILDING APPLICATIONS

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The main aim of this project is to fabricate and develop prototype model of glass cleaning automated robot for high rise building application (Wall climbing robot), cleaning the outer glass walls of high rise building is always dangerous by manual method. The development of this robot offers a novel alternative solution to the glass wall cleaning. A controller is used to control all operations of the robot. It is having capability that it can stick on the vertical as well as inclined surfaces. The robot which is developed is faster, lighter, smaller and more flexible in order to clean glass surface having different building structure. An additional feature is also planned in this robot that it can also clean floors as well. The entire body of the robot is fabricated by using light weight material (electrical casing, aluminium frame etc). The robot uses side shaft geared motors to give drive to the robot, operated by 12 volt (DC) power supply. The robot can also turn left and right at an angle of 30˚ with the help of high torque geared motor, operated by 12 volt (DC) power supply. The robot is able to clean the glass surface by wiper, the wiper is driven by the geared motor of 12 volt (DC) power supply and it can even pour water whenever required by means of water pump on the wiper. The robot can stick to the glass surface with the help of suction cups, a 24 volt (DC) vacuum pump is used to operate suction cups. An electrically operated solenoid valves are used to control the vacuum flow to the suction cups .There are totally 12 suction cups present in the robot, at a time 6 suction cups comes in contact with the surface. This helps the robot to have high gripping force over the glass surface and balance. The Robot is having very simple mechanism when compared to the conventional wall climbing robot. Due to the simple mechanism the weight of the robot is reduced which in turn increases the efficiency of the robot and therefore overall power consumption is less.
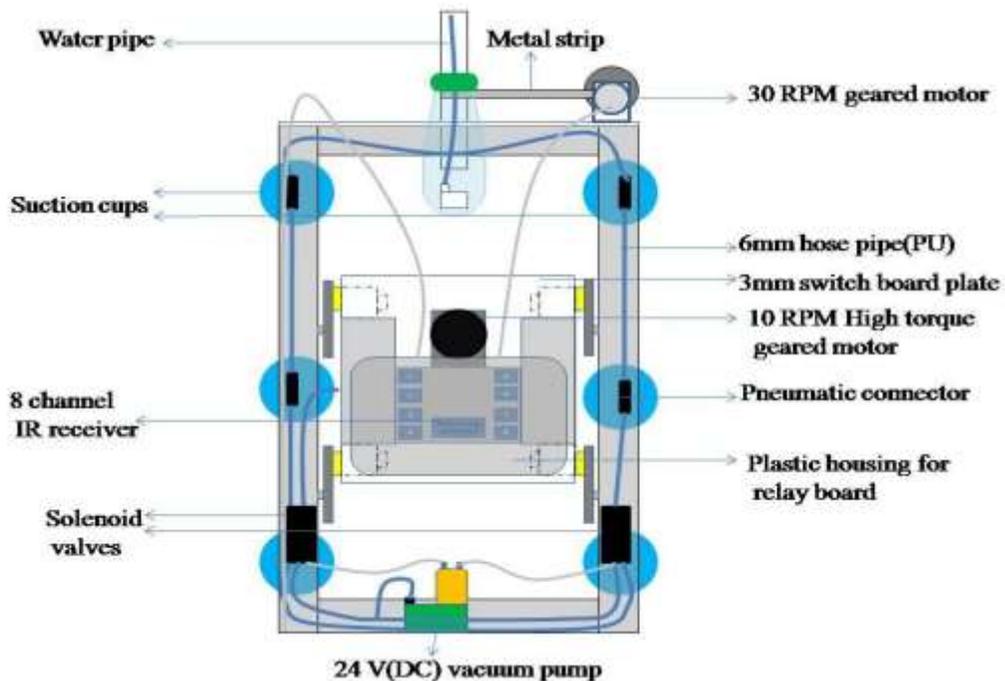
OBJECTIVE:

This kind of robot is actually in continuous development. Huge surface cleaning, and even glass windows or building walls is on study in industrial fields with very different characteristics and innovations. Our target is to build a Glass cleaning automated robot for high rise building application (wall-climbing robot) for window cleaning application. The Wall Climbing Robot (WCR) having capability that it can stick on a vertical as well as inclined surface and can easily move over the surface. The targeted capability to stick with surface can be achieved by suction cups. Suction cups create a vacuum pressure used to stick with vertical or inclined surface. For movement (climbing) of robot it is necessary that some of suction cup should release & that arrangement is obtained by developing the structure such that in which aluminium frame is used to hold the robot to wall & other aluminium plate for climbing (vertical movement of robot) .The motion of the aluminium plate and frame is carried out by providing motor mechanism A controller is used to control all operations of the robot. The robot which is developed is faster, lighter, smaller and more flexible in order to clean glass surface having different building structure. An additional feature is also planned in this robot that it can also clean floors as well. The entire body of the robot is fabricated by using light weight material (electrical casing, aluminium frame etc). The robot uses side shaft geared motors to give drive to the robot, operated by 12 volt (DC) power supply. The robot can also turn left and right at an angle of 30˚ with the help of high torque geared motor, operated by 12 volt (DC) power supply. The robot can able to clean the glass surface by wiper, the wiper is driven by the geared motor by 12 volt (DC) power supply and it can even pour water whenever required by the means of water pump on the wiper. A 24 volt (DC) vacuum pump is used to operate suction cups. An electrically operated solenoid valves are used to control the vacuum flow to the suction cups. There are totally 12 suction cups present in the robot, at a time 6 suction cups comes in contact with the surface. This helps the robot to have high griping force over the glass surface and balance.

The Robot is having very simple mechanism when compared to the conventional wall climbing robot. The power consumption is less. Due to the simple mechanism the weight of the robot is reduced which in turn increases the efficiency of the robot. The whole action is controlled by an 8 channel IR remote control module. The communication between the robot and user is through wireless, the robot that has been designed is guided by controls that take input from human and perform certain actions based on their inputs.

The front portion of present day buildings are fully designed with glass panels and constant maintenance is required. By manual method it is difficult to perform such jobs.

So the objective of this project is to build a Glass cleaning automated robot for high rise building of wall-climbing robot for window cleaning application.

- This robot provides novel alternative solution for window cleaning when compared to the manual method.
- The robot can stick to the vertical as well as inclined glass surfaces for performing cleaning tasks.
- The suction cup technology is used in this project for the robot to climb on the glass surface.
- The purpose of using suction cups is to get good grip over the glass surface and has good weight carrying capacity.
- The vacuum pressure required to operate suction cups is less and the power consumed by the vacuum pump to operate suction cups is less.
- The motors which are used in this robot are DC operated and consumes less power.
- The power supply of the robot is through external source.

- The movements of the robot such as moving up and down, turning left and right, cleaning the glass is controlled through wireless module.
- The robot works according to the instructions given by the operator. Its user friendly, easy to operate, light in weight, has simple mechanisms. The robot is simple in construction and more flexible in working.
- It carries water bottle for performing cleaning operations on the glass surface and the water is poured on the wiper with the help of DC operated water pump.

WORKING:
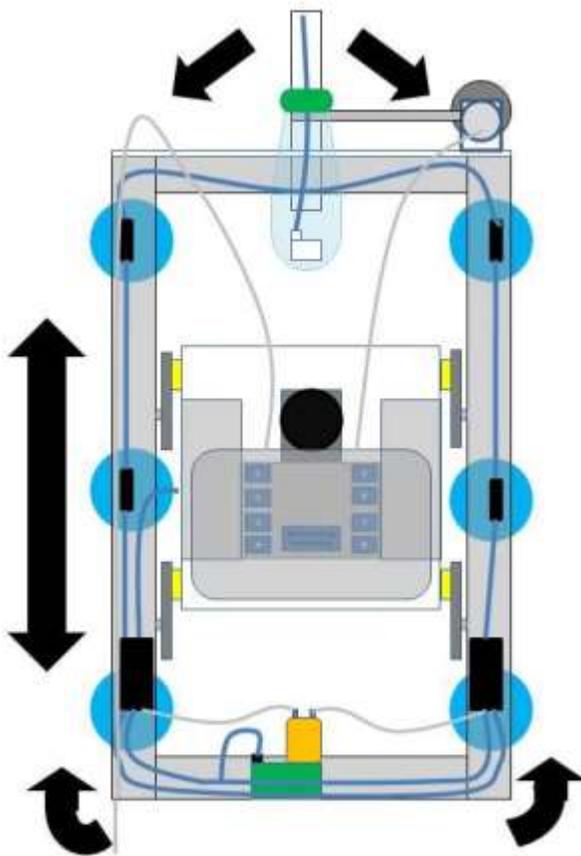
Fig: Working mechasim of robot

The figure shows the working mechanism of the robot. An external power supply is connected to the robot with extension wire. Initially before placing the robot on the glass surface, the suction cups which are present on the aluminium frame is activated and the suction cups which are present on the aluminium plate is deactivated and then placed on the glass surface by the user. The robot sticks to the glass surface. Now, When the user presses switch 1 in the 8 channel IR remote, the signal is transferred to the 8 channel IR receiver which is fixed to the robot as shown in the figure. At the receiver section the receiver turns ON switch 1, the 4 side shaft geared motor which

are connected in parallel to each other moves in the upward path. The shaft of the side shaft geared motor is fixed to the leg, the robot totally contains 4 legs as shown in the figure. So the aluminium plate assembly is moved up with the help of side shaft geared motor, now the suction cups which are present on the aluminium plate comes in contact with the glass surface. The vacuum flow is now supplied to the suction cups which are present on the aluminium plate with the help of solenoid valve, by switching ON switch 8 in the 8 channel IR receiver. Since the suction cups which are present on the aluminium plate engages the glass surface and the suction cups which are present on the aluminium frame is disengaged the vacuum flow is restricting , with the help of solenoid valve by switching OFF switch 7 in the 8 channel IR receiver. Similarly the process continues for the downward movement of the robot. For downward movement switch 2 is operated in 8 channel IR receiver. If a user wants to turn the robot towards left then he has to press switch 4, the suction cups which are present on the aluminium plate should be engaged with the glass surface, the high torque motor which is fixed to the aluminium plate starts rotatating, hence the turning is achieved. Similarly for turning right, switch 3 is pressed. The robot can be tilted at an angle of 30˚. As shown in the fig 5.2 a 30 RPM geared motor is used to operate the wiper, a pulley is fixed to the shaft of the motor, a metal strip is fixed in between pulley and wiper, when the geared motor is ON the rotational motion of the pulley is converted into linear motion where the cleaning operation is achieved. Switch 5 is used for operating the wiper. A small submersible pump is placed inside the water bottle, operates with 3 volt power supply, pumps the water on the wiper in order to wet the sponge which is attached to the wiper and cleaning is done. Switch 6 is used to operate water pump. All the actions of the robot are controlled through wireless means with the help of 8 channel IR remote control module.

**Suction cup working mechanism**
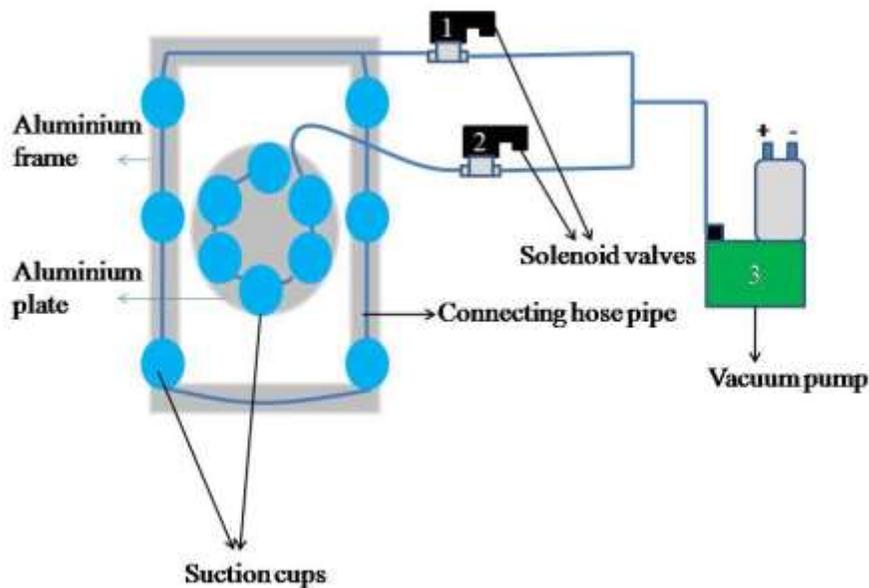
From the figure, the robot consists of two parts one is aluminium frame and the other is aluminium plate. The aluminium frame consists of 6 suction cups, similarly the aluminium plate consists of 6 suction cups arranged in a circular manner. A 6mm connecting hose pipe is connected between the suction cups and vacuum pump as shown

in the figure. The vacuum pump is parallely connected to the solenoid valves (1 and 2). At a time the suction cups which is present on the aluminium frame and aluminium plate comes in contact with the glass surface. When the suction cups which is present on the aluminium frame comes in contact with the glass surface, solenoid valve 1 is turned ON and solenoid valve 2 is turned OFF, so the vacuum flow takes place between the suction cups which is present on the aluminium frame and vacuum pump which helps the robot to stick to the glass surface.When the suction cups which is present on the aluminium plate comes in contact with the glass surface, solenoid valve 2 is turned ON and solenoid valve 1 is turned OFF, so the vacuum flow takes place between the suction cups which is present on the aluminium plate and vacuum pump which helps the robot to stick to the glass surface. The cycle continues. The positive and negative terminals of the vacuum pump are directly connected to the 24 volt (DC) power supply.

Water pump

Water pump Fig shows the submersible water pump, the pump has one inlet and one outlet, the outlet is connected to the 6mm hose pipe. The pump is immersed inside the water and when voltage is given to the pump, the suction is created at the inlet section. And water is pumped at the outlet section. The pump is very much suitable for pumping the water on the wiper during cleaning operation
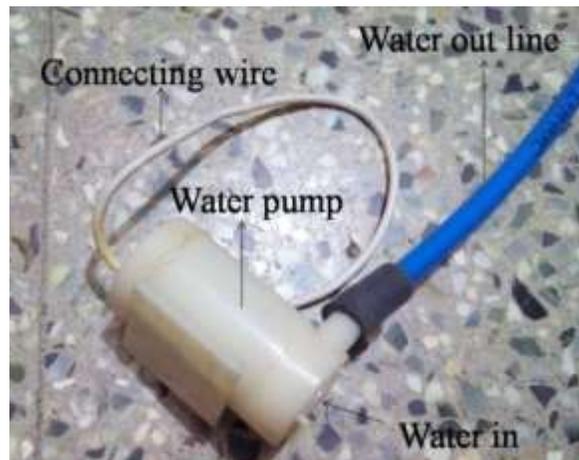
Vacuum pump
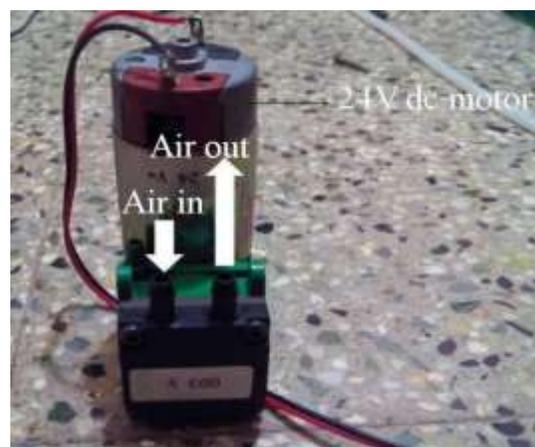
Fig. shows the vacuum pump, the pump has one inlet and one outlet. When the pump runs, the air is sucked at one end and the air is pumped out at the other end. The working is similar to water pump, but the working media in vacuum pump is air. A small piston is present inside the pump which is responsible for the pumping action. In order to operated the suction cups it needs sucked air (vacuum), so it is connected to the inlet section of the pump through 6mm hose pipe. As shown in the fig 5.12, a wire is connected to the power supply in order to drive the motor.

CHANNEL IR REMOTE CONTROL

This IR remote control that you can use to control other devices or circuits up to 8 devices. The control codes are sent in RC5 format modulated to about 38 kHz carrier frequencies. The IR transmitter powered by the CR2016 which is a 3V button Cells Battery CR2016.To extend the life of the battery this is done by putting the CPU into SLEEP mode for most of the time and wake-up only when a key is pressed.
Remote operating range up to visible distance.
Each relays can switch ON or OFF.
Receiver indicates output status by LED (Light Emitting Diodes).
Receiver operates from 12volt AC or DC power supply.

TRANSMITTER:

PIC16F630 is the heart of the transmitter used to send IR command to receiver. It also generates 38 KHz carrier frequency. The CR2016 is 3V battery which is supply for the circuit. When any key not pressed the CPU work in SLEEP mode to reduce battery power consumption and wake-up only when any key pressed. To wake-up the CPU from SLEEP mode the CPU use interrupt on change feature which interrupted when the state on PORT A change then the program execution after an interrupt is at the interrupt vector, if the global interrupt is not enabled, the program starts executing the first line of code right after the SLEEP instruction. In the interrupt service routine the software will scan the key that pressed and send IR command appropriate.
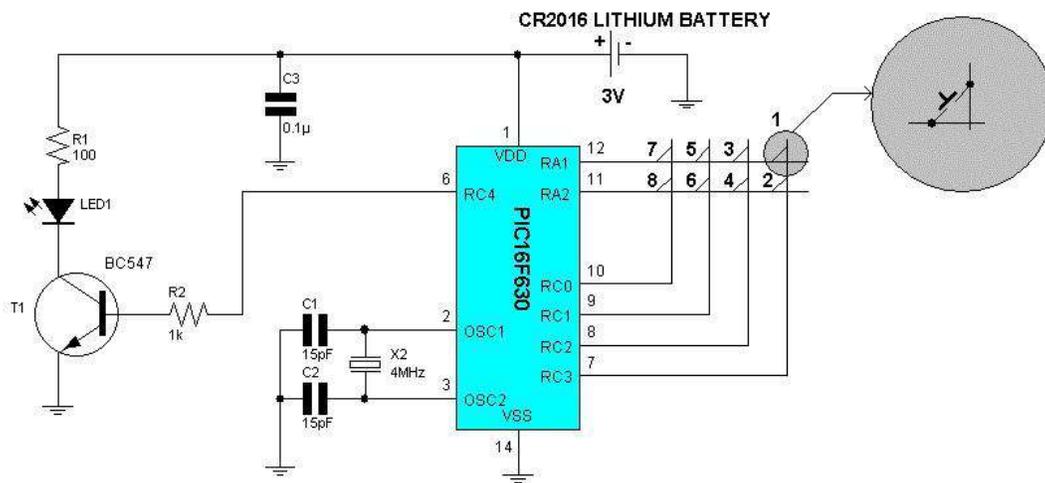

8 channel IR remote control circuit

Receiver

The receiver also use PIC16F630 to control all function then .When power is applied to circuit the CPU will polling the IR input signal which is the output from IR decoder module(**TSOP4838**).After IR received the CPU decoding

the IR command and turn on the buzzer about 60mS to generate beep sound. If you want to know how to decode the RC5 format .The output (relay) work as a toggle output thus when the right IR command decodes complete the output will turn on and if the same IR command sent again the output will turn off.
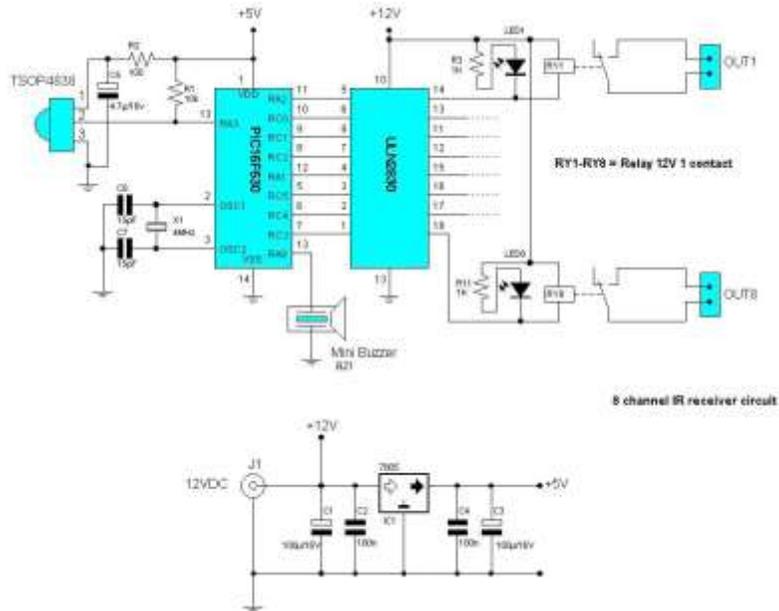
CHANNEL IR REMOTE CONTROLLER RELAY BOARD

This is an 8 channel IR Remote controller Relay Board. 8 relays can be controlled by any RC5 Remote handset. We can operate this board as remote switch board controlling any electrical appliances, lights, and motors etc from IR remote handset following Philips RC5 code. 4, 6, 8 and 12 channel remote relay boards are available. But we have used 8 channel IR remote controller relay board, first two relays are used to control movement of the robot (forward and backward). Relay 1 and 2 is used to control front and back movement of the robot, relay 3 and 4 is used to control backward turning of the robot (right and left), 5 and 6 is used to control wiper and water pump operation,7 and 8 is used to control solenoid valves. A 12 volt power supply is connected to operate the relay board.

Fig: Transmitter and receiver of IR remote control

CONCLUSION

In the present day scenario, application of glass cleaning robot is very much essential in order to reduce human efforts and saves them from dangerous job. The buildings which are having 50-60 floors are very much difficult to clean the glass surface by manual method. Hence this robot helps in order to overcome such difficulties. Robot (Wall Climbing Robot) having capability that it can stick on a vertical as well as inclined surface and can easily move over the surface. The targeted capability to stick with surface can be achieved by suction cups. Suction cups create a vacuum pressure used to stick with vertical or inclined surface. Since the body is made up of aluminium and electrical casing material the robot which is developed is light in weight.

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EXPERIMENTAL STUDY OF EXOSKELETON FOR ANKLE AND KNEE JOINT

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INTRODUCTION

Exoskeletons are defined as standalone anthropomorphic active mechanical devices that are "worn" by an operator and work in concert with the operator"s movements. Exoskeletons are mainly used to increase performance of able-bodied wearer. (e.g. for military applications), and to help disabled people to retrieve some motion abilities.(such exoskeletons are called "active ortheses" in the medical field). As we know, the normal motor capability of legs is crucial and important for human-being"s daily life. Legs, however, are apt to be injured in accident. And the Rehabilitation is essential for the patients to recover after leg operation.

Additionally, diseases, stoke for instance, can also result in the loss of leg function. In order to regain the motor capability, the leg rehabilitation is a fundamental therapeutic approach.

This chapter deals with the background of various types of exoskeletons made till this day.

Basically Exoskeletons are of two types:
Active Exoskeletons
Passive Exoskeletons

Active exoskeletons: They are powered by external sources like a motor, battery powered etc. They work along with the passive exoskeletons to help in its functioning. Passive exoskeletons: These are not powered by external power sources but work on the basis of mechanical linkages, pneumatic and hydraulic mechanisms, spring controlled devices etc.

Since active exoskeletons pose a restriction to the amount of external energy that can be supplied in terms of quantity, quality and time we have focused purely on passive type of exoskeletons. Passive elements are implemented in the exoskeleton to either store or dissipate energy with the objective of reducing the residual energy that the human would have to expend for locomotion.

OBJECTIVE

To develop a portable device capable of providing ankle joint mechanical assistance during walking without using external power from onboard actuators. The device we set out to build should be light weight, portable and user friendly. The device should not hamper the normal gait cycle of an individual but should only enhance it.

Our goal was to provide all of the benefits of an actively powered exoskeleton but in a portable framework without motors or an external energy source to provide an ease in the gait cycle. We hypothesize that a passive wearable device using parallel elastic elements during the walking cycle is capable of recycling a significant portion of the ankle joint mechanical work and could reduce the metabolic cost of walking. We set out to develop a passive, 'energy-neutral' system with the following key design objectives:

1. Deliver torque to the ankle following a pattern similar to the normal joint moment during walking
2. Recycle elastic energy during the stance phase while allowing free ankle rotation during swing.

METHODOLOGY

In this section we are going to discuss about the constructional features of each and every components used in this mechanism. We are going to deal with the specifications and the assumptions made while designing the mechanism.

The working of the model is explained in a step by step manner as follows:

1. A clutch 1 and an elastic element 2 are coupled between upper portion and lower portion to control storage and release of mechanical energy by elastic element. Clutch 1 includes a housing formed by an inner portion and outer portion.

2. Clutch 1 includes a rotating drum formed by a back retainer 14 and a timing pin holder 4. Drum rotates about a rod (main shaft) via roller bearing assembly.

3. A pulley 15 is located between back retainer 14 and timing pin holder 4. Pulley 15 is attached to linkage 8 to allow extraction of linkage 8 from clutch 1 and retraction of linkage 8 into clutch1.

4. A flat spring 27 applies a counter clockwise torque to drum to effect retraction of linkage8 when the force applied to linkage 8 is less than that applied by flat spring 27.

5. In order to provide an engagement and locking mechanism to control energy storage and release by elastic element 2, clutch 1 includes a rotary ratchet 5 and a pawl 7.

6. Ratchet 5 is coupled to timing pin holder 4 and rotates with timing pin holder 4.

7. Pawl 7 is mounted on a shaft 18 that rotates with respect to inner and outer portions and of the housing. Roller bearing assemblies allow pawl 7 to rotate on shaft 18.

8. A pair of timing pins 17 control the engagement and disengagement of pawl 7 with ratchet 5.

9. A stopping pin 6 limits angular rotation of pawl 7 in a direction away from ratchet 5.

10. As stated above, spring 2 retracts linkage 8 into clutch 1. To effect this retraction, a portion of spring 2 is fixedly attached to and at least partially circumferentially surrounds pulley 15.

11. Another portion of spring 2 is fixedly attached to and surrounds a spring holder 10, which rotationally attaches spring 2 to a spring shaft 11.

12. When pulley 15 rotates in the clockwise direction, spring 2 is wound from its resting position, and spring holder 10 rotates in a counterclockwise direction about shaft 11.

13. This winding motion causes spring 2 to store mechanical energy.

14. When the force on linkage8 becomes less than the reaction applied by spring 2, spring 2 unwinds, causing the portion of the spring that surrounds shaft 11 to rotate in the clockwise direction and effecting rotation of pulley 15 in the counter clockwise direction to retract linkage 8.

The names of the various parts used are as follows:

PART NUMBER	NAME OF THE PART
4	Timing pin disc
9, 19, 20, 21	Bearing
12, 24	Fasteners
14	Back Retainer
15	Pulley
16, 22	Countersink screws
17	Timing pin
18	Pawl shaft
23	Wooden plate
27	Flat spring

RESULTS AND CONCLUSION

The prototype was tested for various phases of a normal gait cycle. The ankle angles at various phases of walking are presented in a graphical and tabular form after our testing in this chapter. We also propose various tests to be carried out after building the actual model and for its commercial viability.

Different colour codes are used in the graph to specify the durations of energy storage and

release with the help of the elastic member.

The energy stored in the spring is released during the Push-off stage which is shown in purple in fig.

The graph is broken into steps and explained in the following section:

The various phases in walking are:

1. <u>Heel strike</u>: Just prior to heel strike, clockwise movement of pin holder under force applied by linkage causes timing pin to engage pawl. With ratchet once engaged, motion of ratchet is only allowed in the counterclockwise direction, which occurs from heel strike to foot flat position under force of spring to retract linkage into clutch.

2. <u>Foot flat</u>: In the foot flat position, as illustrated by image and the corresponding clutch position, the clutch is locked because linkage and elastic element apply clockwise force/torque on ratchet, and motion in the clockwise direction is prevented by the shapes of the teeth in ratchet and the corresponding shape of pawl.

3. <u>Dorsiflexion</u>: During dorsiflexion, when the clutch is locked, elastic element (Spring) stretches from its resting position and stores mechanical energy produced by the user's center of mass rotating over the ankle (during stance dorsiflexion).

4. <u>Push-off</u>: During push off (stance plantar flexion), the energy stored in elastic element (spring) is released, aiding in locomotion of the subject. Timing pin contacts pawl and causes pawl to release from ratchet to allow free rotation of the ankle joint during the foot swing phase of walking prior to the next heel strike.
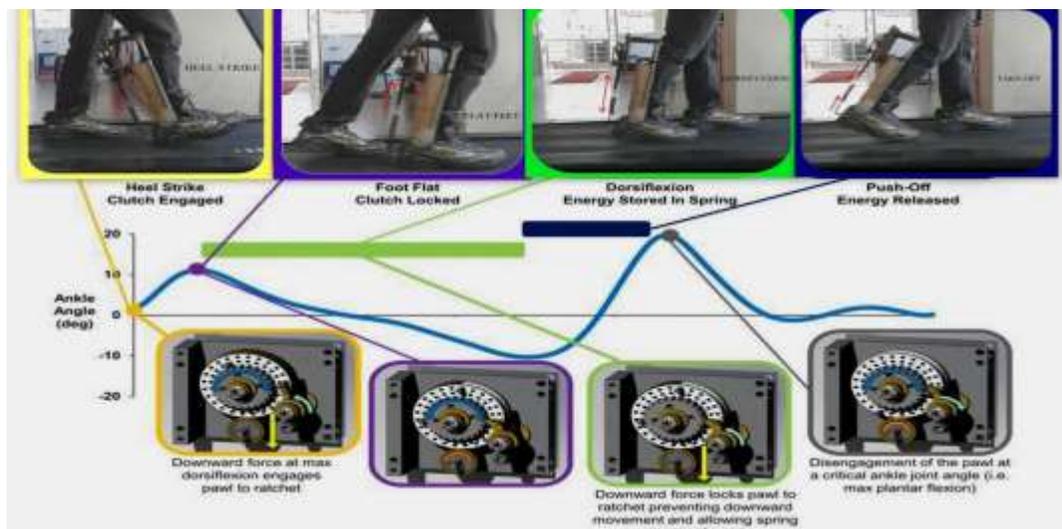
SCOPE FOR FUTURE WORK

1. We suggest using the 3D printing technique since it greatly reduces the weight of the component. The conventional manufacturing constraints can be overcome by this method.
2. Testing the clutch on the bench top to verify robust behavior over many cycles
3. Performing human walking tests (in both impaired and unimpaired subjects) to determine whether the device can reduce metabolic energy expenditure at different speeds and spring stiff nesses.

4. Continuing to develop the next generation prototype with the capability to adjust the timing of engagement of the clutch automatically without any human intervention.

DESIGN AND PERFORMANCE ANALYSIS OF
SOLAR POWERED TROMMEL SCREEN

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Solar power is the conversion of sunlight into electricity, either directly using photovoltaics (PV), or indirectly using concentrated solar power (CSP). Concentrated solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. Photovoltaics convert light into an electric current using the photovoltaic effect. The main aim of this study is to design and analyze the performance of a solar powered trommel screen that can segregate particles by size like compost soil, sand, coal etc., a system that is relatively cheap, portable, and depends only on renewable solar energy. The project is motivated from the advantages of trommel screen over vibrating screens and reduction of time, labour cost and increase efficiency for segregating the components. The project goal is to efficiently produce trommel screen that can run using solar power. Experiments were carried out to evaluate the performance of a trommel screen for compost cleaning to increase product quality. Theoretical analysis was conducted for optimizing sieve speed and sieve inclination angle. The machine performance was studied as a function of change in material feed rate, screen opening size and compost moisture content. Performance evaluation of the trommel screen was carried out in terms of machine productivity, separating efficiency, compost losses, cleaning efficiency, required power, energy requirements and criterion cost. The experimental results reveal that the performance of the trommel screen during compost cleaning was in the optimum region under the following observations: Operate the trommel screen at a sieve speed of 25 rpm (1.18 m/min). The slope angle of the cylindrical sieve on the horizontal plane (sieve inclination angle) should be lower than 15 degrees. The screen opening size should be of about 10 mm. clean compost at a moisture content of about 25-30 %. Operate the trommel screen at an average feed rate of 4 Kg/min.

From the experiments that were carried out the segregation of the particles were smooth and reliable. With optimum time and optimum feed the segregated particles can be replaced by the old conventional methods. And by the use of solar or green energy and by trial and error basis the best suitable optimum conditions have been adopted for the design and performance analysis of the solar powered trommel screen.

Objectives

The objectives of this project work is to:

a) To replace the conventional methods by the non conventional energy sources.
b) To design and optimise the trommel screen performance by trail and error methods.
c) Utilize a trommel screen for cleaning compost to increase product quality.
d) Optimize some different operating parameters affecting the performance of the
   trommel screen. i.e.,
   - Material feed rate
   - Sieve speed
   - Screen opening size
   - Sieve inclination angle
   - Compost moisture content
e) Evaluate the trommel screen performance from the economic point of view.
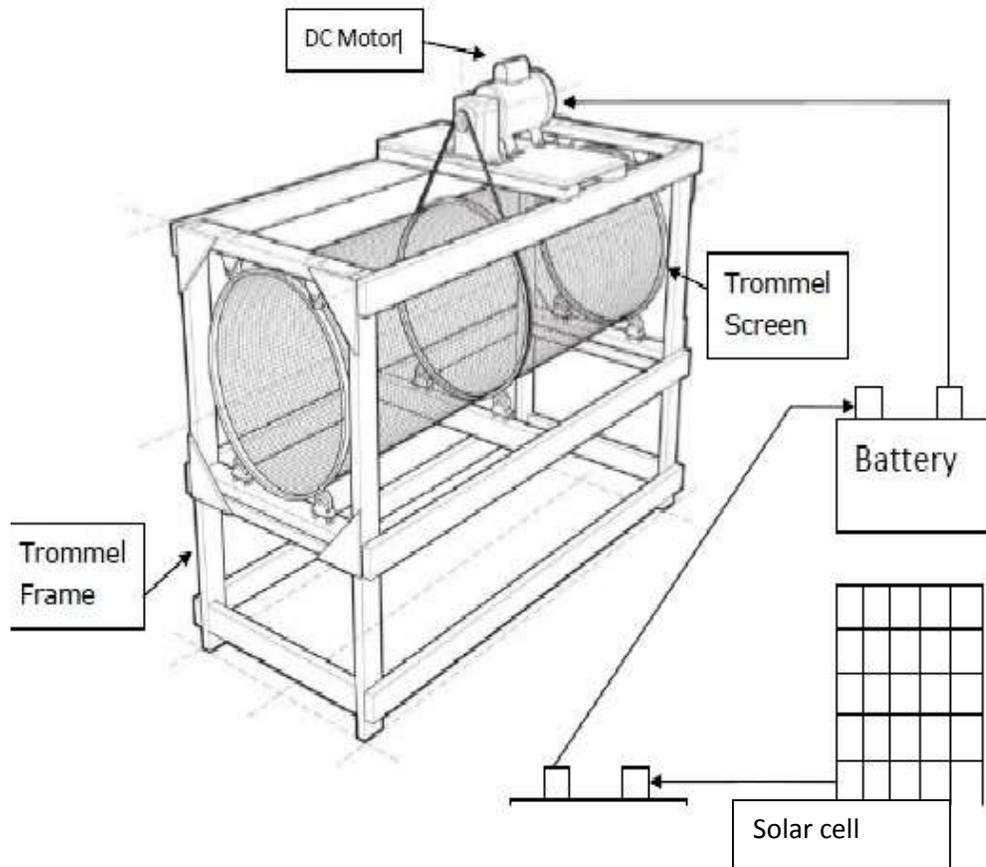
PROBLEM STATEMENT AND METHODOLOGY

PROBLEM

This project is intended to design and analyse the solar powered trommel screen. The trommel screen plays the replacement of vibration screens and disk screens as it is vibration free, easy maintenance, cheaper to produce and higher durability. As trommel screen is used for segregating different size of particles purposes the weight also plays a major role. Thus trommel frame should be designed such that it can bear the different loads acting directly on it. The trommel frame can be made using steel tubes or wooden blocks of different cross sections. Different cross section tubes/woods have different weights and also behave differently under loads. Thus the trommel frame is modelled by taking into consideration all the aspects in CATIA V5 R20. After the trommel frame is designed the next problem is to analyse/optimize some different operating parameters (i.e., material feed rate, sieve speed, Screen opening size, Sieve inclination angle, compost moisture content) affecting the performance of trommel screen.

METHODOLOGY

The methodology of solar powered trommel screen involves designing, modelling, fabrication work, determination of suitable specifications of dc motor, battery, solar panel calculations and testing results like machine productivity, separation efficiency, cleaning efficiency etc.,. And also optimizing some different operating parameters like material feed rate, sieve speed, screen opening size, inclination angle that affects the performance

of trommel screen. The trommel frame is modelled using CATIA V5 R20. The models were designed by considering different component to be housed. Fabrication of the whole unit is pretty straight forward and involves metal cutting, welding, mesh work, painting and drilling. All these processes is done at workshop using simple machines – lathe, drill, welding, milling etc.

MODELLING

Modelling is the process of producing a model; a model is a representation of the construction and working of some system of interest. A model is similar to but simpler than the system it represents. One purpose of a model is to enable the analyst to predict the effect of changes to the system. On the one hand, a model should be a close approximation to the real system and incorporate most of its salient features. On the other hand, it should not be so complex that it is impossible to understand and experiment with it. A good model is a judicious trade off between realism and simplicity. Simulation practitioners recommend increasing the complexity of a model iteratively. An important issue in modelling is model validity. Model validation techniques include simulating the model under known input conditions and comparing model output with system output.


Fig: Isometric view of Trommel Frame
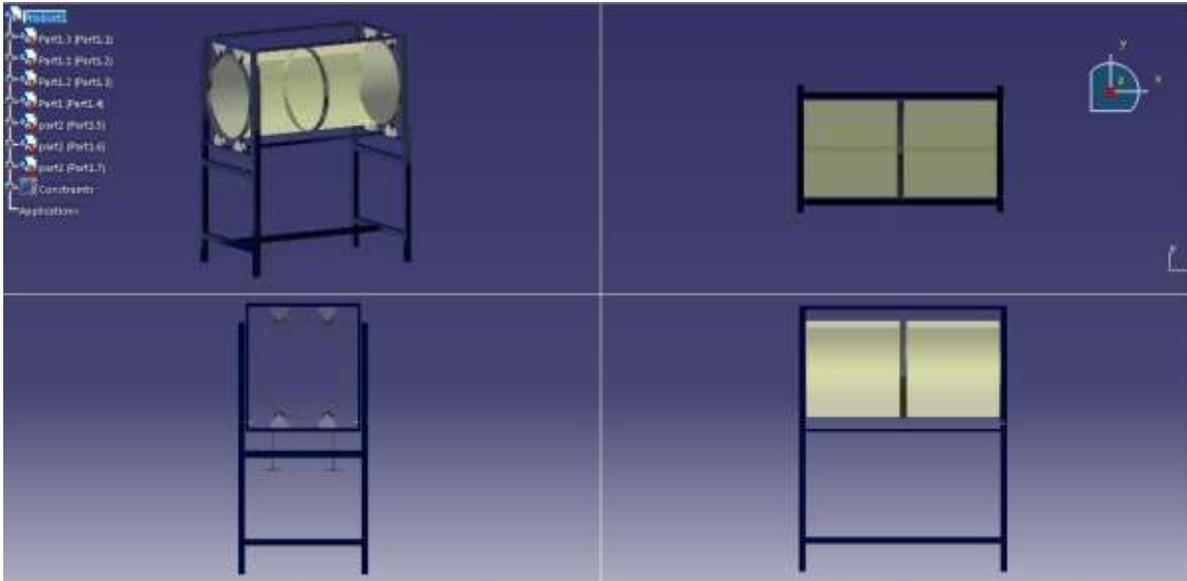
Fig: Over view of Trommel Frame

CONCLUSION

After completing the project it can be said that we have learned an enormous amount with regards to the fabrication process. We have seen what can happen when things are underestimated, i.e. the torque generated by the motor, dia of the drum. We have also seen just how many things can go wrong when we are attempting to put our design together. On the other hand we have also seen how things can go right, for example the smooth segregation of compost soil with the suitable size of mesh was exactly as we had envisioned. The combination of rollers, v-belt, motor and the screen provided our trommel with the innate ability to create a smooth rotation of the trommel screen. We feel that we have gained a great deal of knowledge in regards to the process of design, fabrication and constructing a model, and we feel that if we were to do it again the results would only be better.

Experiments were carried out to evaluate the performance of a trommel screen for compost cleaning to increase product quality. Theoretical analysis was conducted for optimizing sieve speed and sieve inclination angle. The machine performance was studied as a function of change in material feed rate, screen opening size and compost moisture content. Performance evaluation of the trommel screen was carried out in terms of machine productivity, separating efficiency, compost losses, cleaning efficiency, required power, energy requirements and criterion cost.

The experimental results reveal that compost losses as well as criterion costs were minimum while, separating and cleaning efficiencies were maximum under the following conditions:

- Operate the trommel screen at a sieve speed of 25 rpm (1.18 m/min).
- The slope angle of the cylindrical sieve on the horizontal plane (Sieve inclination angle) should be lower than 15 degrees.
- The screen opening size should be of about 10 mm.
- Clean compost at a moisture content of about 25-30 %.
- Operate the trommel screen at an average feed rate of 4 kg/min.

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CARBON DIOXIDE AND VAPORS OF OLIVE OIL POWERED SOLAR COOKER

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Today, due to the increase in cost of living, people are finding alternate means to generate energy. Non-conventional sources of energy such as solar, wind and geothermal energy are being harnessed to meet the increase in demand and cost. As we live in a tropical region, solar energy is reliable and available in abundance.

A solar cooker is a simple device that utilizes the heat energy obtained in form of thermal radiation form sun to cooks the food, boils water and also can be used for sterilizing instruments. Solar cooker has seen its existence as late as 1700's. Solar cooker has seen its dominance mainly in developing and emerging countries especially in India.

In order to overcome the issues with the existing solar cooker technology, we have developed a prototype to elevate the temperature, thereby increasing the heating efficiency within the cooking chamber. Cooking chamber is enclose within a glass box expect for the side available to be opened to place food/water inside the container. The glass box and cooking chamber are well sealed so as to not allow the carbon dioxide into the cooking space. A small opening is provide in the glass box fitted with a cork, which acts as an inlet and outlet port to allow the space within the glass box to be filled with carbon dioxide. Cooking takes place in a solar box cooker based on the principle, the black absorbing material coated inside the walls of the cooking chamber absorbs direct thermal radiation from the sun converting it to heat energy. In general, sunlight both direct and reflected enters the solar box through the glass, the entered light is scattered by the greenhouse gases mainly water vapor present within the container who's wavelength increases. It turns to heat energy when it is absorbed by the dark absorber plate and cooking pots. This heat input causes the temperature inside of the solar box cooker to rise until the heat loss of the cooker is equal to the solar heat gain. Temperature obtained is sufficient to cook food and pasteurize water.
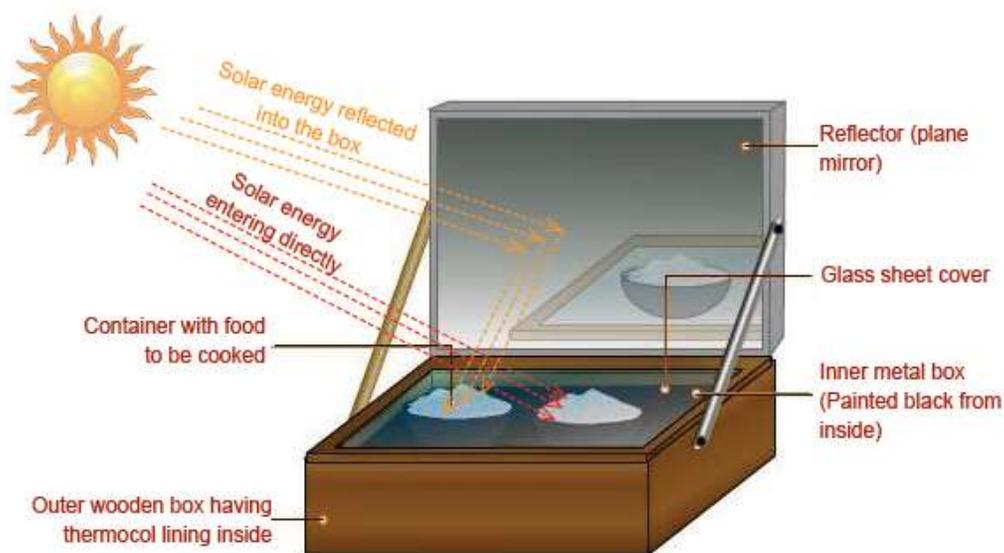
FABRICATION

Fig : Fabrication Process

WORKING:
The container of food is placed inside the solar cooker which is of copper material, and the solar cooker is placed in direct sunlight. If the solar cooker is entirely in direct sunlight, then the shadow of the solar cooker will not overlap with the shadow of any nearby object. Foods that cook quickly may be added to the solar cooker later. Rice for a mid-day meal might be started early in the morning, with vegetables, cheese, or soup added to the solar cooker in the middle of the morning. Depending on the size of the solar cooker and the number and quantity of cooked foods, a family may use one or more solar cookers.

Different kinds of solar cookers use somewhat different methods of cooking, but most follow the same basic principles.food cooks faster when it is in smaller pieces, food placed inside a solar cooker is usually cut into smaller pieces than it might otherwise be. For example, potatoes are usually cut into bite-sized pieces rather than roasted whole For very simple cooking, such as melting butter or cheese, a lid may not be needed and the food may be placed on an uncovered tray or in a bowl. If several foods are to be cooked separately, then they are placed in different containers.

A solar cooker is turned towards the sun and left until the food is cooked. Unlike cooking on a stove or over a fire, which may require more than an hour of constant supervision, food in a solar oven is generally not stirred or turned over, both because it is unnecessary and because opening the solar oven allows the trapped heat to escape and thereby slows the cooking process. If wanted, the solar oven may be checked every one to two hours, to turn

the oven to face the sun more precisely and to ensure that shadows from nearby buildings or plants have not blocked the sunlight. If the food is to be left untended for many hours during the day, then the solar oven is often turned to face the point where the sun will be when it is highest in the sky, instead of towards its current position. The cooking time depends primarily on the equipment being used, the amount of sunlight at the time, and the quantity of food that needs to be cooked. Air temperature, wind, and latitude also affect performance. Food cooks faster in the two hours before and after the local solar noon than it does in either the early morning or the late afternoon. Large quantities of food, and food in large pieces, take longer to cook. As a result, only general figures can be given for cooking time. With a small solar panel cooker, it might be possible to melt butter in 15 minutes, to bake cookies in 2 hours, and to cook rice for four people in 4 hours. With a high performing parabolic solar cooker, you may be able to grill a steak in minutes. However, depending on local conditions and the solar cooker type, these projects could take half as long, or twice as long.

MODELING

Modeling is the process of producing a model; a model is a representation of the construction and working of some system of interest. A model is similar to but simpler than the system it represents. One purpose of a model is to enable the analyst to predict the effect of changes to the system. On the one hand, a model should be a close approximation to the real system and incorporate most of its salient features. On the other hand, it should not be so complex that it is impossible to understand and experiment with it. A good model is a judicious trade off between realism and simplicity. Simulation practitioners recommend increasing the complexity of a model iteratively. An important issue in modeling is model validity. Model validation techniques include simulating the model under known input conditions and comparing model output with system output.


**Fig: Isometric view of Solar Cooker**

Fig : Overview of Solar Cooker
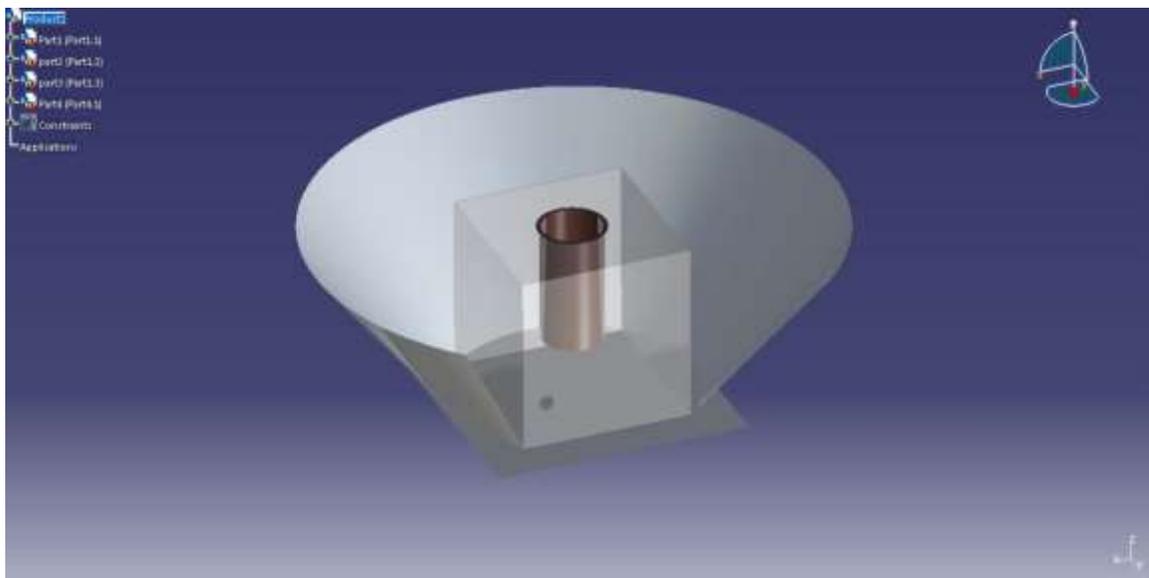
Fig: Isometric view of Solar Cooker with collector

CONCLUSION

Solar cooker is the upcoming field that has gained prominence in the recent years. it is the vast subject that encompasses various fields of study. Cooking with solar energy remains a fuel-saving technique, which can provide definite help in situations of fuel scarcity. Solar cookers and especially cooking boxes can be successfully locally made. However, the introduction of a new way of cooking results in radical changes in the rhythm of life in a community.

The basic aim of the project was to increase the efficiency of the solar cooker by introducing CO_2 gas into the outer chamber .the fabricated prototype of carbon dioxide powered solar cooker has been found to be efficient and effective in supplying the required heat to the cooking chamber.

The prototype of the carbon dioxide powered solar cooker successfully showed the increase in efficiency of solar cooker by about 22^0C more than the normal conventional solar cooker moderate cooking temperatures in simple solar cookers help preserve nutrients also food doesn't need to be stirred and won't burn — food can simply be placed in a solar cooker and left to cook, unattended, for several hours while other activities are pursued. The solar cooker can be used both in the rural and urban areas. It also replace the traditional stoves burnt on firewood in remote parts of our country thus retaining our forests and ecological biodiversity

we can also conclude that the proposed system has more advantage compared to the conventional solar cooker and is able to meet objectives, which are:

- Harness solar power efficiency
- Provide eco friendly solar cooker
- Reduce cooking time
- Reduce cooking cost
- Reduce maintenance cost

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BICYCLE WITH FLYWHEEL- A NEW PRODUCT DEVELOPMENT

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A flywheel is a rotating mechanical device that is used to store rotational energy. Flywheels have a significant moment of inertia and thus resist changes in rotational speed. The amount of energy stored in a flywheel is proportional to the square of its rotational speed. Energy is transferred to a flywheel by applying torque to it, thereby increasing its rotational speed, and hence its stored energy. Conversely, a flywheel releases stored energy by applying torque to a mechanical load, thereby decreasing its rotational speed. A bicycle, often called a bike (referred to as a "pushbike", "pedal bike", "pedal cycle", or "cycle‖"), is a human-powered, pedal-driven, single-track vehicle, having two wheels attached to a frame, one behind the other.

In the presence study propelling force, pedal force, cranking force, gearing force were calculated for bicycle and the power required to propel the bicycle on constant velocity. In design of flywheel the kinetic energy, mass moment of inertia, hoop stress were calculated and various graphs were plotted based on the performance analysis and result shows that all are within the safe limits as cited by the design handbook and literatures. The result shows that when a rider wished to reduce cycling speed, the flywheel is capable of temporarily storing the kinetic energy released.

The ingenuity of this bike in its ability to use a spinning flywheel to reclaim energy lost when cyclist brakes and use it later to increase bike speed. The bike with flywheel is efficient in energy usage and its makes cycling more amazing for rider by allowing him to boost his speed when desired. Propelling force, various forces and power required to propel the bicycle are varying velocity were determined and performance analysis were carried out and graphically represented. The flywheel designs were approximately optimized were hoop stress, mass moment of inertia were determined as cited by literature available.

Fig: Bicycle with Flywheel

INTRODUCTION

A flywheel is a rotating mechanical device that is used to store rotational energy. Flywheels have a significant moment of inertia and thus resist changes in rotational speed. The amount of energy stored in a flywheel is proportional to the square of its rotational speed. Energy is transferred to a flywheel by applying torque to it, thereby increasing its rotational speed, and hence its stored energy. Conversely, a flywheel releases stored energy by applying torque to a mechanical load, thereby decreasing its rotational speed.

Three common uses of a flywheel include:

1. They provide continuous energy when the energy source is discontinuous. For example, flywheels are used in reciprocating engines because the energy source, torque from the engine, is intermittent.
2. They deliver energy at rates beyond the ability of a continuous energy source. This is achieved by collecting energy in the flywheel over time and then releasing the energy quickly, at rates that exceed the abilities of the energy source.
3. They control the orientation of a mechanical system. In such applications, the angular momentum of a flywheel is purposely transferred to a load when energy is transferred to or from the flywheel.
4. Flywheels are typically made of steel and rotate on conventional bearings; these are generally limited to a revolution rate of a few thousand RPM. Some modern flywheels are made of carbon fiber materials and employ magnetic bearings, enabling them to revolve at speeds up to 60,000 RPM.

A bicycle, often called a bike (referred to as a "pushbike", "pedal bike", "pedal cycle", or "cycle‖), is a human-powered, pedal-driven, single-track vehicle, having two wheels attached to a frame, one behind the other.

Bicycles were introduced in the 19th century in Europe and now number more than a billion worldwide, twice as many as automobiles. They are the principal means of transportation in many regions. They also provide a popular form of recreation, and have been adapted for

such uses as children's toys, general fitness, military and police applications, courier services and bicycle racing.

Objectives of the Project

- In the presence study propelling force, pedal force, cranking force, gearing force were calculated for bicycle and the power required to propel the bicycle on constant velocity
- In design of flywheel the kinetic energy, mass moment of inertia, hoop stress were calculated and various graphs were plotted based on the performance analysis and result shows that all are within the safe limits as cited by the design handbook and literatures.
- The result shows that when a rider wished to reduce cycling speed, the flywheel is capable of temporarily storing the kinetic energy released.

Experimental setup

Fig: Bicycle with flywheel at the centre

Fig: Bicycle with flywheel at the rear

PROBLEM STATEMENT AND METHODOLOGY

The bicycles used for cross-country by the cyclist require maximum effort for climbing the gradients. The peddling effort is directly affect the joints of the human body. Mountain bikers who suffer knee pain are typically afflicted with inflammation of illiotibial tissue, or band. This fibrous tissue runs between the knee and hip. With the piston-like up and down of cycling, this tissue becomes swollen and tender. Cycling is often cited as a low-impact alternative to bone-jarring sports, but cyclists are no strangers to knee pain. The structural stresses and somewhat unnatural movements required to ride a bike can cause injury in a variety of ways. Luckily, most sources of knee pain can be easily adjusted.

One of the alternatives suggested by the sport experts is that the leg bone joints should be rested at least for few minutes in an hour. This is only possible if bicycle riding to be stopped. If this is the case the distance to be covered by the cyclist in a day will be reduced. To overcome this problem, the project is proposed with an intention to make a comfortable ride for the cyclist.

Modification of a cycle with flywheel will require lot of positional problems, for a simple reason the present cycle components and wheelbase is optimized to the maximum. To execute this idea we have come out with two probable positions. One position consists of the Flywheel is located just behind the rider, position of the flywheel will not disturb his riding comforts, but the additional links which are required for holding this flywheel is to be designed. The location of this flywheel is to be designed and developed with necessary sprocket in it. The other location of the flywheel is centre to the bicycle wherein the centrifugal force which is getting acted on the rotating member maybe less, but the extra comfort space is to be sacrificed for this purpose. This two positions are to be practically executed. And depending on magnitude of the centrifugal force the location is to be optimized for this innovative idea.

Components for bicycle with flywheel

1. New rear wheel shaft with extra attachment for one more sprocket.
2. Two smaller sprockets one at the rear wheel hub and one near the flywheel
3. Additional chain to connect rear wheel sprocket to flywheel sprocket after necessary design for transmission efficiency.

The above mentioned components for this innovative project will be designed for maximum efficiency for transmission.

The ingenuity of this bike lies in its ability to use a spinning flywheel to reclaim the energy lost when the cyclist brakes and use it later to increase the bike's speed. When a rider wishes to reduce cycling speed, the flywheel is capable of temporarily storing the kinetic energy released. This energy can later be used by the cyclist to resume increased speed levels. Thus, the mechanism facilitates a cyclist to recover the loss of speed that takes place during barking'. This bike with flywheel is efficient in energy usage and it makes cycling more fun for the rider by allowing him to boost speed when desired. This project is aimed at easing out of problems of cyclists who ride the bike in cross country riding.

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CONSERVATION AND TRANSPORTATION OF FRESH WATER
ALONG THE COASTAL REGION OF INDIA

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INDRODUCTION:

The Indian continent is dependent on the NORTH EAST and the SOUTH WEST monsoons. The NE monsoon prevails over the north eastern states including ORRISA, ANDHRA PRADESH, TAMILNADU, PONDICHERRY and parts of KARNATAKA, and the SW monsoon prevails over states from GUJARAT to KERALA and parts of KARNATAKA and ANDHRA PRADESH and north eastern states.

India's only perennial river GANGES provides fresh water from the melting glaciers of the Himalayas. River BRAHMAPUTRA floods ASSAM and the neighbouring states during the NE monsoon due to heavy rains.

CHALLENGES:

Due to the vagaries of nature, we in India suffer either due to FLOODS (excess of rain) or no rain causing severe DROUGHT. To augment this unpredictable monsoon and to provide fresh water to all the states of India, many plans have been discussed and discarded due to the challenges faced. The fresh water could either be from the river Ganges or the flood waters due to excess rain.

One of the challenges in diverting the Ganges water to South India is the DECCAN PLATEAU which is an average 500 meters high. To overcome this height the water needs to be pumped up which will then flow down due to gravitational force. This pumping can only be achieved in stages and to pump the water, we need transmission lines and sub stations for the use of electricity. Electrical energy can be generated downstream, but the power generated will be lesser than the power required for pumping the water up the gradient. Currently there is a shortage of electricity in our country and the additional demand will strain the existing system.

To channel the water, canals need to be cut in the rocky face and also on the land. To do so, the canals need to be aligned and this would go through existing villages or mountain ranges. Tunnels and canals could be built at an enormous cost after completion of the land acquisition, but the land acquisition and cash compensations for rehabilitation of the villagers will cripple such a mega project due to cash flow and the time frame.

Another constraint is the large volume of water that would be lost due to EVAPORATION and SEEPAGE along its course.

ALTERNATE METHOD:

As an alternative, the innovative method of transportation of the Ganges or the flood waters will be, via AQUA DUCTS laid on the sea bed along the coat of India.

METHODOLOGY:

During heavy monsoon, the flood water flows into the sea and is wasted. This methodology is to divert the flood water into FEEDER TANKS and is transported via aqua ducts laid on the sea floor to a GARLAND OF TANKS built along the sea coast OR in the sea for distribution.

Similar tanks are built near the estuary of the rivers, or in the sea with provision to filter the debris that is usually carried by the flood waters including loose earth. The feeder tanks are built with more than one outlet at the bottom (approximately 30 mts. below the ground level) with slew gates to regulate the water.

Large diameter (10 feet or more) co extruded pipes are fitted to these outlets and the same is laid on the sea floor and connected to the next RESERVOIR TANK built on the land or sea about 50 Km. or as per the need.

When the flood water flows into the first tank (Feeder Tank), the water will flow into the aqua ducts at the bottom and travel to the next tank (either north or south) and fill the tank (due to atmospheric pressure). The pipes are laid on the sea bed at approximately 30 feet depth, so that it does not interfere with either shipping lines or fishing boats or the sand can be dredged and the pipe line concealed. The pipes are anchored to the sea floor with suitable concrete anchoring device.

The flood water that flows into the first tank will never fill the tank as the water keeps flowing into other tanks through the network of pipes and tanks thus maintaining the same level throughout the garland of tanks.

As such, if a tank near Bengal starts to fill up, the water will travel all the way to Gujarat and all the tanks will fill up simultaneously. Likewise if water flows into a tank near Gujarat the same will travel to Bengal and all the tanks will fill up simultaneously.

By providing a spill off at the intermediary tanks regulated by slew gates, the rising water can be drained into inland irrigation canals for agricultural use all along the sea coast. In practice no tank will fill up and the water will never flood an area. This system also acts as a FLOOD CONTROL SYSTEM.

The water in the reservoirs can be lead to filtering tanks and treated for drinking water.

This system when in place will ensure PREVENTION OF FLOODS, SAVING FRESH WATER and transportation of the same to other states and put to irrigation use and for augmenting DRINKING WATER SUPPLY.

During the SW monsoon the tanks on the south west coast of India will feed on the flood or excess water and transport the same to the southern states on the eastern coast, similarly during the NE monsoon, the tanks on the eastern coast of India will feed and transport the water to the western coast. The water flows in both directions due to the atmospheric pressure and the principle is in using the mean sea level to maintain the level of water in the tanks along the coast.

India has a geographical advantage to commission such a system since the western coast at Mumbai is only 30 cms higher than the eastern coast at Paradeep.

NO electricity or energy other than ATMOSPHERIC PRESSURE is used in transporting the excess flood water along the coast of India, thus providing water throughout the year AT NO COST once the infrastructure is in place.

In the event of both the monsoons failing, the water from the Ganges or Brahmaputra will be fed into the feeder reservoir to provide fresh water all through the year thus providing additional water for irrigation and for human consumption 24 x 7 x 365 days,

PILOT PROJECT:

As a pilot project this methodology can be tried in Tamilnadu by transporting the excess ground water from the Veeranam lake to Cuddalore and from Cuddalore the water is fed to the FEEDER TANK and the water transported to MAHABALIPURAM, and connected to tanks at THIRUVANMYUR and ENNORE which are approximately 50 to 60 Km away. This pilot project can later be linked to other states to form the garland of tanks in the manner first explained. Similar areas can also be identified and water can be transported in other states.

Water can also be taken from the Indian mainland to Andhaman and Nocobar islands.

Some expert advice is needed to verify the rate of flow of water in the pipes depending on the pressure of the water in the tanks.

CONSTRUCTION OF TANKS:

Suggested Length x Breadth x Depth: 100 Mts x 100 Mts x 30 Mts.

MANUFACTURE OF PIPES:

The extrusion of pipes can be manufactured on board a ship and will be laid on the sea floor as the pipe is extruded. This method will save handling and transportation charges as the length of the pipes will be kilo meters long. The raw material for the manufacture of the pipes will either be reached to the ships by motor boats or by helicopters.

Note: Underwater tunnels to provide vehicular transportation has already been tried and tested in the world under severe conditions, and our project would not be a challenge to our country, on the other hand it would put our country on the global map as being the first to conserve water and to implement a system to fight flood control and in increasing potable water for human consumption, increase in acreage for cultivation in an innovative methodology.

Many schemes have been designed to bring the excess water from the Ganges & Brahmaputra to South India.

The height of the Deccan plateau has been a hindrance as the water needs to be pumped up the gradient which needs electricity. The planning has always been to pump the water up the gradient in pipes and to convey the water via canals downhill, for which land has to be acquired involving huge funding to pay for land compensation and rehabilitation of the habitats along the course, laying pipe lines, digging canals, generation of additional electricity and installation of new substations and transmission lines to convey electricity for the project is also time consuming.

When all the above hurdles are overcome and the project is commissioned there will be a huge LOSS in the volume of water conveyed via canals due to evaporation and seepage. Maintenance of the canals and pipe lines will be an additional burden. The only positive side to this methodology will be, the canals will serve as a waterway for transportation.

A NEW INNOVATIVE METHODOLOGY is to use the basic principles of nature to convey the excess water from the rivers and the monsoon using ATMOSPHERIC PRESSURE.
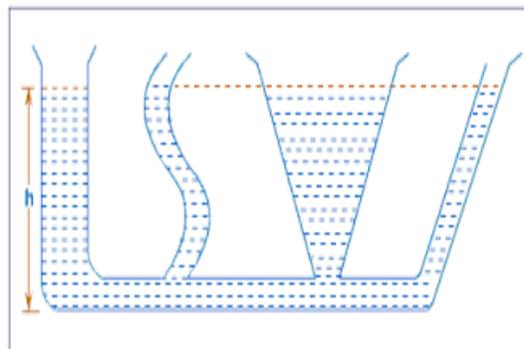

LIQUIDS FIND THEIR OWN LEVELS

LIQUIDS FIND THEIR LEVELS is the basic principle used in this methodology.

It is suggested to either build INLAND or OFF SHORE tanks near estuaries of rivers along the coast of India from Bengal to Gujarat via Kanyakumari (6,000Kms). These tanks will be connected by corrugated pipes at approximately 30 mts below ground level and buried in the sea bed or anchored suitably and similar tank connected at 50 kms intervals or need based to form a garland of tanks.
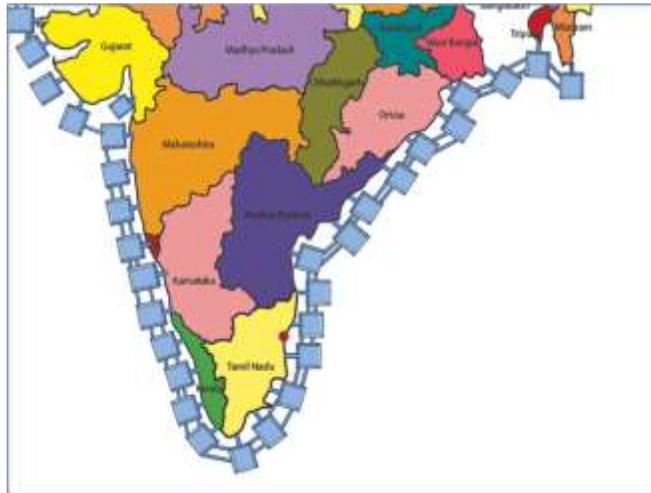
GARLAND OF TANKS CONNECTED BY PIPES

The Tanks will have an inflow canal to bring in either the flood water or the excess water from the perennial rivers or the excess monsoon water and this water will be conveyed via the corrugated pipes at the bottom to other tanks. As per the principle when water flows into ONE of the tanks it will flow and rise in all the tanks simultaneously due to atmospheric pressure.

Water flow in normal Conditions

Inlet / Outlet Canal Connected to the TANK

Flow of Water in Either Direction

Distance between Tanks
50 Km or Need based

Water flow during Transfer

Inlet / Outlet Canal Connected to the TANK

Flow of Water in Either Direction

Distance between Tanks
50 Km or Need based
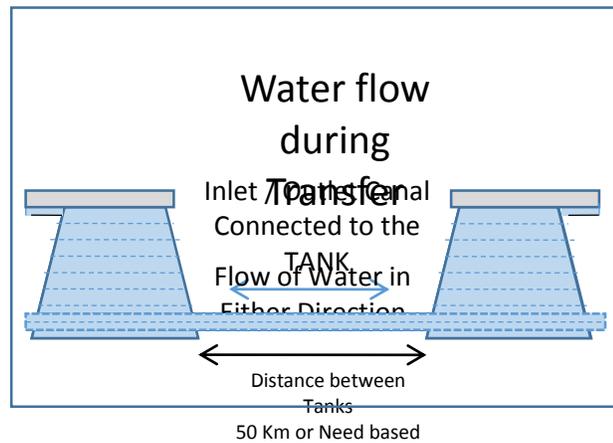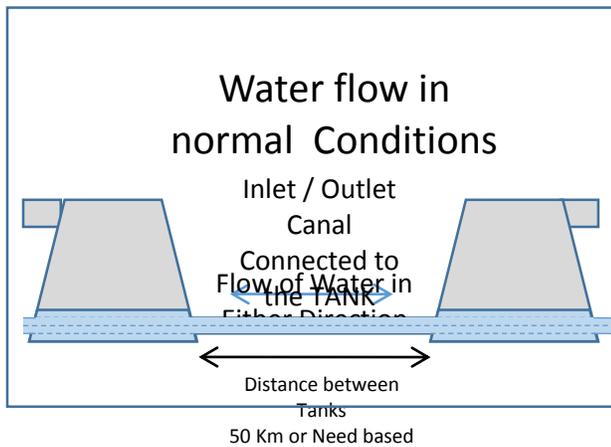
In Theory if 100 liters of water is fed into one tank and conveyed to 100 tanks via the pipes connected at the bottom, each tank will contain only ONE liter of water (excluding the water in the pipes line).

Such a system will be able to either convey the excess water from Bengal to Gujarat or from Gujarat to Bengal.

Such a methodology ensures a two way conveying system ensuring that the excess water from the South West monsoon can be conveyed to the Eastern coast from Kanyakumari to Bengal or the excess water from the North East monsoon to the Western coast from Kanyakumari to Gujarat.

In an event when both the monsoons fail the excess water from Ganges and Brahmaputra can be conveyed along the coast over 6,000 Km.

Such a system can also be useful in conveying flood water to other water starved regions.

Such a system incurs only the initial infrastructure cost and no cost for conveying the water in either direction of flow.

TEN STATES of INDIA will benefit directly from this innovative system ensuring drinking water over 6,000 kms of coast line throughout the year.

Aerial View of
DISTRIBUTION TANK
With
INLET PIPES &
OUTLET CANAL

Aerial View of
FEEDER TANK
With
INLET CANAL and
OUT LET PIPES
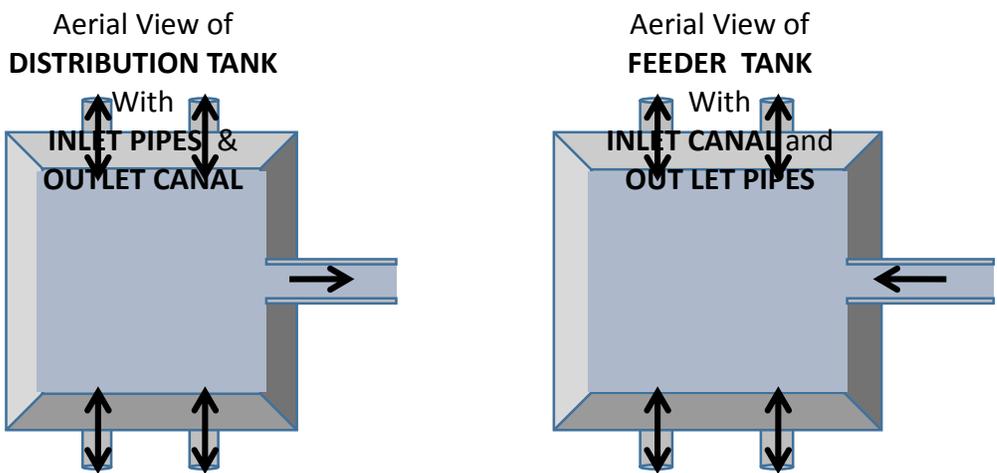
INDIAN RAILWAYS ON FAST TRACK

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INDIAN RAILWAYS is the fourth largest in the world and operates over ONE lakh Km of track and close to 7,000 stations, but is yet to take advantage of this huge resource.

While INDIA is transforming itself from an underdeveloped country into a developed country, we need to address the need for improvement of the INDIAN RAILWAYS.

Few innovative ideas are proposed below to achieve the above target in a phased manner.

1. INCREASED REVENUE from sleeper class by increasing the number of berths.
2. Increasing COMFORT & SAFETY.
3. Increasing the SEATING COMFORT in CHAIR CAR.
4. ADDITIONAL TOILETS & RAIN WATER HARVESTING in coaches.
5. COMMON FILLING points for toilet water
6. Running of Engines on NATURAL GAS.
7. Replacement of PANTRY CAR with additional compartment.
8. Introduction of HIGH SPEED TRAINS (350 Km / hr and above)
9. DOUBLE SIDE FENCING along the tracks.
10. MODERNISATION of stations.
11. ADDITIONAL RENTAL FROM COMMERCIAL SPACE in stations.
12. MODERNISATION of operations.

INCREASED REVENUE FROM SLEEPER CLASS: It is envisaged to realign the berths along the length of the train. This new innovative solution will provide 25 % additional berths which will ease the wait listed passengers. The realignment of berths in one train such as TAMILNADU EXPRESS (considering only ELEVEN sleeper class) will generate over **Rs.100s of Crores** additional revenue per annum as detailed in the PPT.

SLEEPER CLASS (Continued): It is also envisaged that the present double deck coaches can be used to have a **FOUR TIER** sleeper class that will provide **ELEVEN** berths instead of the EIGHT berths in present alignment and in case of using the new alignment, **FOURTEEN** berths can be accommodated. This double deck coach might be possible only in certain routes.

INCREASING COMFORT AND SAFETY: The overhead fans will be replaced by air ducts using fewer fans of higher capacity than the existing 27 fans per coach. Individual reading lights will be provided. The locking arrangement of the MIDDLE berth will be redesigned to lock positively to eliminate just hanging from chains.

INCREASING THE SEATING COMFORT IN CHAIR CAR: A new arrangement of seating as proposed in the PPT in the chair car, will ensure more shoulder space and comfort to the passengers. Foldable seats and compartmentalised space beneath each seat will ensure individual space for hand luggage under the seat.

ADDITIONAL TOILETS IN COACH: The existing toilets will be redesigned to accommodate two toilets in the present space. Number of toilets increased from four to eight per coach. Toilets increased by 100 %. The toilets will have

a collection box for the night soil and the same will be disposed in a common septic tank before reaching a station. Gobar Gas can be generated from soak pits which can be piped for industrial use and the slurry drained as manure.

RAIN WATER HARVESTING: During rainy seasons, the runoff from the roof top can be lead into the overhead tanks of the toilets and the overflow from the tanks can be lead to the closets for flushing. This will ensure saving of water and cleaner toilets.

COMMON FILLING POINT FOR TOILETS: All the water tanks in the coaches need to be connected and a common filling point will ensure filling of these toilets from a single point using a high pressure pump. This will reduce the work load of the water filling crew.

RUNNING OF ENGINES ON NATURAL GAS: trials to be conducted to run diesel engines on NATURAL GAS and if found successful, the natural gas can be filled in special tanks and engines run on this fuel. If the existing engines can be suitably modified and run on natural gas, a reduction of fuel cost can be achieved along with reduced pollution.

REPLACEMENT OF PANTRY CAR: Replacing the pantry car with the introduction of thermal efficient trolleys to cater to the passenger needs will ensure food being served hot and providing more seats/ berths, increasing the revenue to the railways.

INTRODUCTION OF HIGH SPEED TRAINS: As illustrated in the accompanying power point presentation, it is envisaged to LEASE the AIR SPACE above the existing rail track. A new THREE TIER construction will ensure a THREE TIER surface transport system. The lower tier (Ground Level) will serve the existing system of rail transport, the middle tier will service the HIGH SPEED TRAINS and the upper tier will service road transport dedicated only to passenger cars. This system of leasing the air space will be provided on a BOT (Build, Operate & Transfer) system. The revenue from the leasing of AIR SPACE can be invested in the purchase of high speed trains.

DOUBLE SIDE FENCING: A double side fencing or hoarding will be provided on the side of the rail track and this will be leased to prospective advertisers. A hooping FOUR lakh Km (as shown in the PPT) of leasable hoarding, this will also be on a BOT system adding revenue to the Railways. Even if only One lakh km of hoarding is erected, it will fetch over 10,000 Crores Rupees.

MODERNISATION OF STATIONS: All major stations should have facilities as shown in the PPT to bring in revenue.

MODERNISATION OF OPERATIONS: All operating systems need to be updated to increase safety of the Railways.

INSTALLATION OF WARNING SYSTEM AT UNMANNED LEVEL CROSSINGS: An innovative warning system has been developed that can be installed even at places not having electricity in order to raise an alarm to warn of the approaching trains.

Existing Design

700.00 REF
932.35 REF
771.46 REF
390.00 REF
850.00 REF
55.00
600.00
2150.00
900.00
600.00
70.00
2550.00
55.00
520.00 REF
600.00
670.00
440.00
1870.00
350.00
700.00
TOP
3060.00
RIGHT
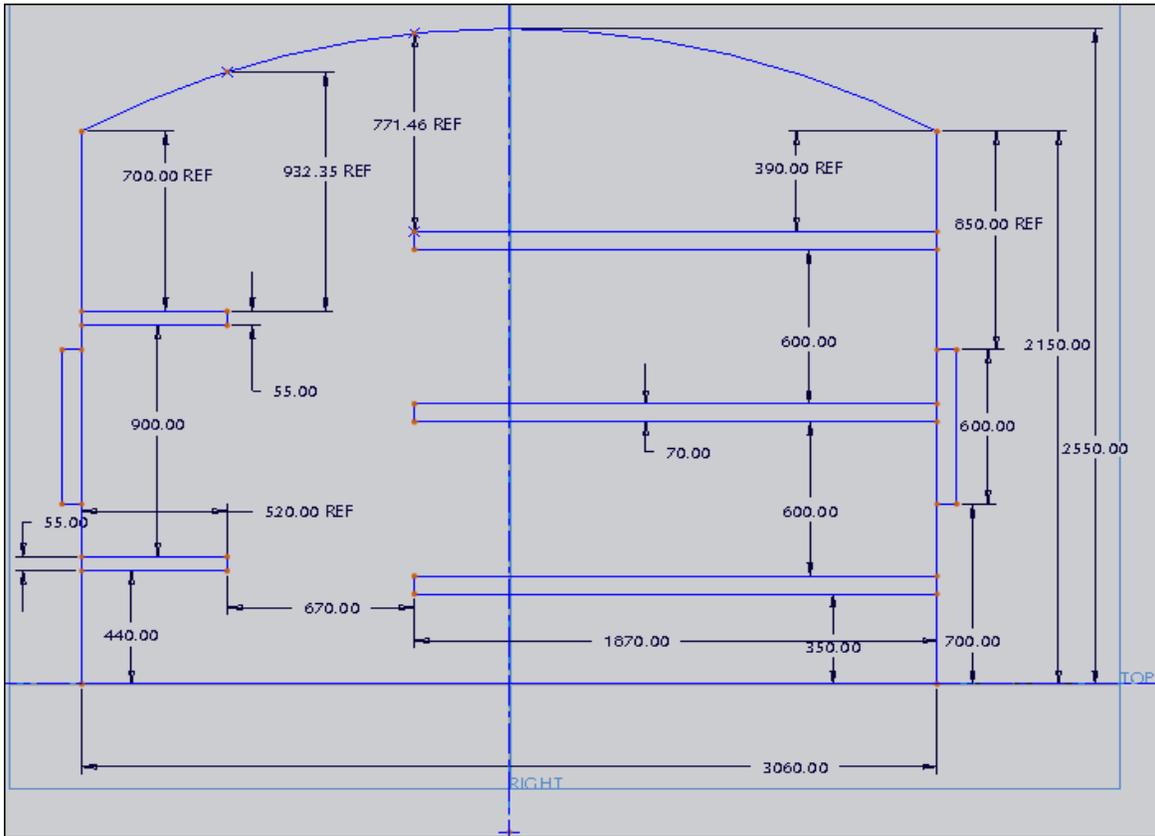
Improved Radical Design: All berths are aligned longitudinally
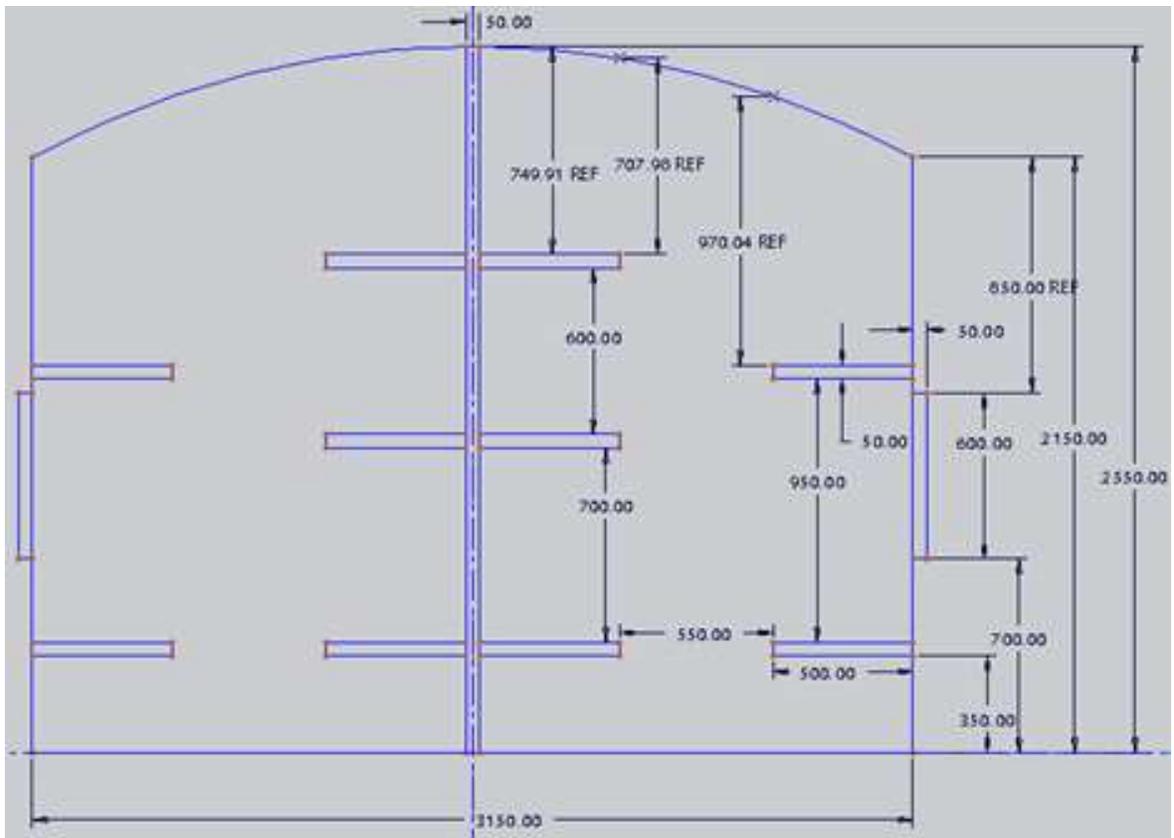
Emergency Exit

- Placed in roof
- Simple latch mechanism for release
- Ease of access from both sides
- Accessed even when rollover occurs
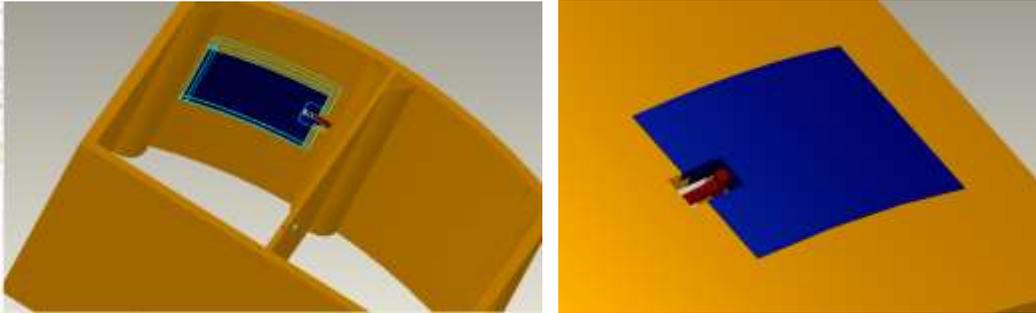
AIR BAFFLES

- Air baffles are provided for air circulation
- Number of fans reduced to 4(industrial fans) from 27 no's per bogey

AIR BAFFLES
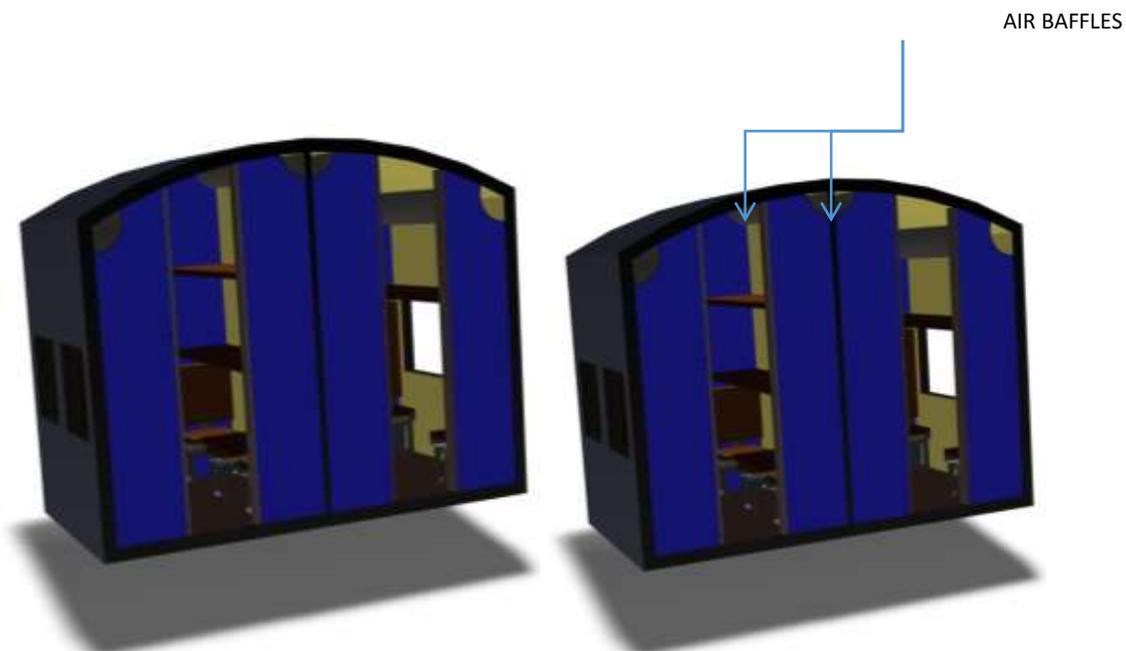
The improved design has two passages (walk ways) and very useful for passengers' movement during emergency also. It resulted in increase of number of berths from 72 to 90! Which in turn will increase the revenue for Railways and provide more opportunities for passengers.

Indian Railways on FAST TRACK
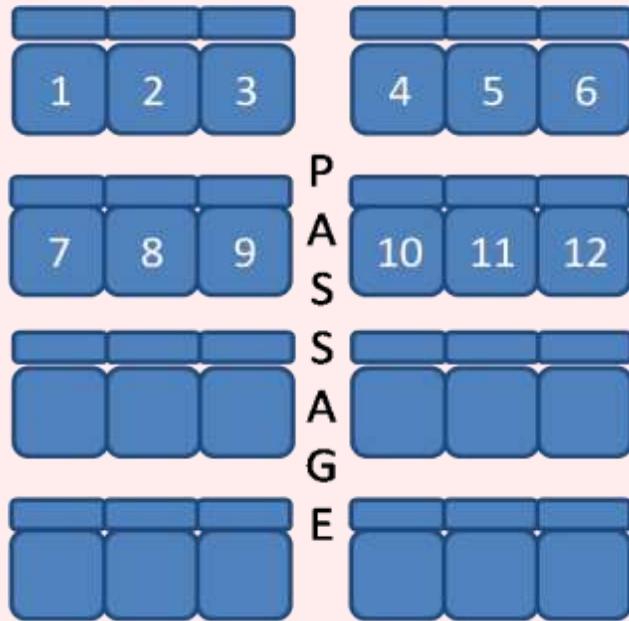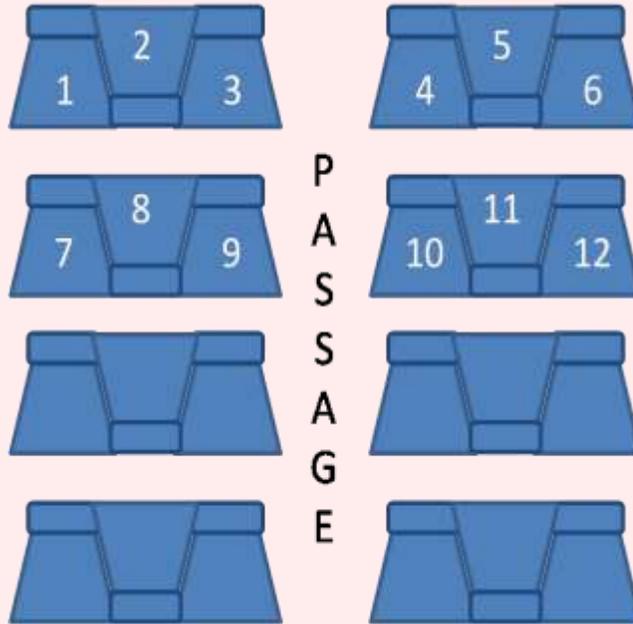
INCREASING SAFTY & COMFORT

• Replacing individual FANS with common BLOWER type vents with adjustments for personnel comfort

• Providing individual reading lights

• Providing innovative HAND REST to function as HEAD REST in sleeper class.

• CLOSED luggage racks for safety and individual hand baggage under seats.

• Providing RAIN HARVESTING in coaches .

• Providing containers to load food and do away with pantry car to increase revenue.

• Providing a positive locking device for the middle berth.

W.Amarnath – 98840 98864

Data Logging and Monitoring For Weigh Feeder Controller

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COMPANY NAME: IPA Pvt Ltd

DESCRIPTION OF THE PROJECT

Weigh feeder is a closed loop control system in which a precise one can be had over the flow of materials, which has indicating, totalizing and controlling instruments and circuits. The main objective of this system is to feed the required quantity of material at a particular present rate. These feeders are operated in group so that different materials are fed in the required proportion and mixed before generating the finished materials after suitable processing. My project entitled **DATA LOGGING AND MONITORING FOR WEIGH FEEDER CONTROLLER**. The roles of PC interface are monitoring the performance online through data send from the hardware and also record the same. The PC software provides to reset the totalizer, ration settings etc. Normally PC will be in receiving mode only but we can transmit the data rate settings and Totalizer reset from the PC also when PLS is in group mode. PC is scanning data coming from the PLC and is displaying the corresponding status on the screen for each materials.

Here a modbus protocol is used for communication. In simple term, it is a method used for transmitting information over serial lines between electronic devices. The system is capable of accepting external signals from other controllers or from the processor computer. These gravimetric feeders are in operation in steel, cement, fertilizer and chemical industries. Here PC acts as master and system as slave. We communicate PLC through RS232 interface. This cable is connected to the serial port of PC. Each system consist of control and local panels, load cells to measure the instantaneous load, a digital tacho to sense the speed of the belt and a belt feeder conveyor shaft is driven by an air motor coupled through the gear box.

Existing System

Movement of bulk material is an essential feature in modern industrial process. The simplest and fastest mode of transportation of such material is to convey them over a moving belt. In this operation the precise weighing of material, as it moves, as assumed a key role in process industries. Hence weigh feeder is a closed loop control system in which a precise control can be had over the flow of materials, which has indicating, totalizing and controlling instruments and circuits. The weigh feeder is custom engineered equipment that finds application in continues bulk proportioning of solids.

Limitations

  The gravimetric feeder is operated by a closed loop control system enables feeding at a controlled rate and exercises precise control over rate of flow based on a micro controller. The system is capable of accepting external signals from other controllers or from the process computer, depending on the extent of plant instrumentation. This S/W is developed to store the data coming from the PLC. Normally PC will be in receiving mode only but we can transmit the data Rate setting and Totalizer reset from the PC also when the PLC is in group mode.

  Without the PC software it is difficult to set the rates, time and the controlling of the system. And its time consuming when a person or group of persons are doing this work. So The PC software reduces the human work, Cost and Time.

METHODOLOGY

  Weigh feeder is a closed loop control system in which a precise one can be had over the flow of materials, which has indicating, totalizing and controlling instruments and circuits. The main objective of this system is to feed the required quantity of material at a particular present rate. These feeders are operated in group so that different materials are fed in the required proportion and mixed before generating the finished materials after suitable processing. My project entitled **DATA LOGGING AND MONITORING FOR WEIGH FEEDER CONTROLLER**. The role of PC interface is monitoring the performance online through data send from the hardware and also store record the same. The PC software provides to reset the totalizer, ration settings etc. Normally PC will be in receiving mode only but we can transmit the data rate settings and Totalizer reset from the PC also when PLS is in group mode. PC is scanning data coming from the PLC and is displaying the corresponding status on the screen for each materials.
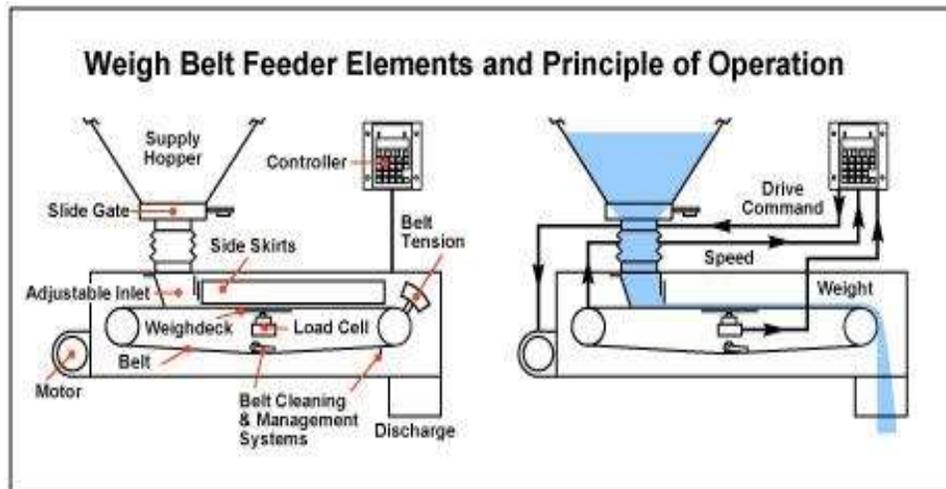
Fig 2.5 Weigh Belt Feeder Elements and Principle of Operation

TECHNICAL DESCRIPTION

MINIMUM HARDWARE REQUIREMENTS

- Processor   :   Pentium(R) Dual-Core and above

- Memory size   :   2.00GB RAM
- System Type   :   32-bit Operating System
- Storage   :   10GB Minimum
- Display   :   EGA/VGA Color Monitor
- Key Board   :   keyboard
- Mouse   :   Mouse

SOFTWARE REQUIREMENTS

Operating System   :   WINDOWS 7
Tools Used   :   Front End: Microsoft Visual Studio 2008(C#.net)
                            Back End: Sql Server 2008

BENEFIT OF THE PROJECT

To the development of the software, system was tested with sample data output obtained is according to requirements. The performance of the system is evaluated. The system is user friendly. Wide storage feeder often flexibility for beyond conventional buffer feeder system with less installed cost and less maintenance. The storage feeder opens up new opportunities not only to solve many of the problems associated with low cost bulk materials available to today's cement plant, but also to make other new materials and by product not currently used a particular consideration

Windows 8 Apps - Trip Expense Tracker, Contacts Hub, Healthy Heart

STUDENT NAME: Sharath. M
USN: 1NZ10MCA22 Year: **2013**
GUIDE NAME: Dr. V. Asha
COMPANY NAME: Trainedge Consulting Pvt. Ltd.

DESCRIPTION OF THE PROJECT

Metro style apps built for Windows 8 are beautiful, intuitive, and the focal point of your experience, filling your entire screen so there are no distractions. Apps can adapt to a variety of form factors and screen resolutions, such as thin slates or large monitors, and can work on x86, x64, and ARM platforms. Apps work together, making it easy to search, share, and send content between them. When you reconnected to the Internet, your apps come alive with activity and show you the latest content so that you can stay up to date at a glance. Windows 8 gives you the important apps you need for your daily life, including a touch browser. And Windows Store delivers everything you expect for getting apps. You'll find the apps you want. You can be confident that they're very safe because Microsoft screen them. You'll enjoy the flexibility of browsing, downloading, and buying or trying (if available). Your apps are ready for you on any Windows 8 PC you use—desktop, laptop, tablet—whether yours, a friend's, or a family member's. With a connected account, you can download your apps and use them wherever you are.

Your apps come with you

When you sign in with your connected Microsoft account to another PC running Windows 8, your Metro style apps and settings go with you, so it's just like you're using your own PC. You'll also be signed in to all of the websites you were signed in to. Your connected account is like a portable, personal PC that appears on any Windows 8-based PC you're using. You're always ready to pick back up where you left off no matter where you are.

Apps can work together

Apps can communicate with each other in Windows 8. So, if you want to send pictures in email, and they're in different places like Facebook, Flickr or on your hard drive, you can easily pick and send the ones you want. Suppose if some app is currently being used and the data has to be shared or sent via email then sharing of the data can be done using "share" feature available through "settings charm". One app can invoke other app in certain circumstances.

Always on and always connected

Metro style apps run and stay up to date even when the PC is on standby. When you're connected to the Internet, you'll receive information updates, email, VoIP calls, instant messages, and be able to stream music or other content in the background. When Windows comes out of standby, your apps don't need time to catch up. The apps periodically updates which will be intimated by the Microsoft server which apps have the updates and this will take place only if the user grants the permission to update it otherwise it holds on until the user accepts and installs the updates. Some apps can run even without Internet connection and some do require it.

Internet Explorer 10 - the web by touch

Windows 8 ships with Internet Explorer 10, which can run as either a desktop program (where it operates similarly to Internet Explorer 9), or as an app with a new full-screen interface optimized for use on touch screens. Internet Explorer 10 also contains an integrated version of Flash Player, which will be available in full on the desktop, and in a limited form within the "Metro" app.

Metro style Internet Explorer 10 provides a fast and fluid touch-first browsing experience that's all about your sites, making them feel increasingly more app-like. With faster performance, leading security protection, more hardware acceleration and site-ready HTML5 support, IE10 continues to allow developers to build a richer and more beautiful web.

Windows Store

The new Windows Store features great apps you might be familiar with and others you'll love getting to know. It's easy for you to find the apps you want, ranging from exciting new games, to the productivity tools you already know and trust on Windows.

Windows Store is a digital distribution platform built into Windows 8, which in a manner similar to Apple's App Store and Google Play, allows for the distribution and purchase of apps designed for Windows 8. Developers will still be able to advertise desktop software through Windows Store as well. To ensure that they are secure and of a high quality, Windows Store will be the only means of distributing WinRT-based apps for consumer-oriented versions of Windows 8.

METHODOLOGY

In windows 8 Metro apps Microsoft azure server is used to store the data. These apps are configured with Microsoft azure server to retrieve and store data. All data is dynamically uploaded by the publisher in server. Apps are integrated with respective service reference to communicate with cloud server.
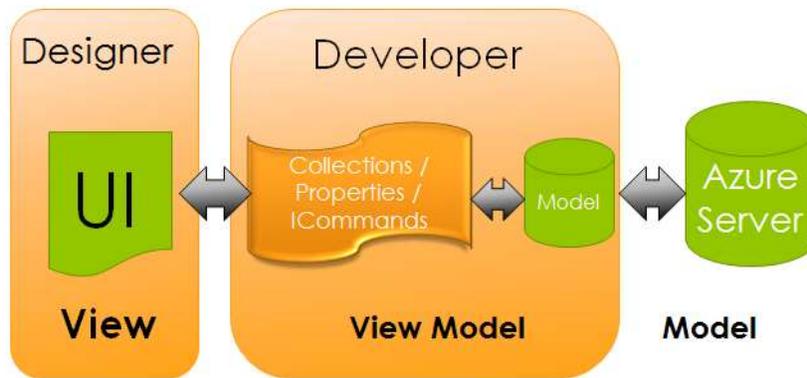
Figure 2.2: MVVM Roles

TECHNICAL DESCRIPTION

MINIMUM HARDWARE REQUIREMENTS

- Processor: 1 gigahertz (GHz) or faster with support for PAE, NX, and SSE2
- RAM: 1 gigabyte (GB) (32-bit) or 2 GB (64-bit)
- Hard disk space: 16 GB (32-bit) or 20 GB (64-bit)
- Graphics card: Microsoft DirectX 9 graphics device with WDDM driver

SOFTWARE REQUIREMENTS

- Windows 8 Operating System.
- Visual Studio 2012 with Blend.
- Microsoft Advertising SDK.
- Microsoft Azure Server SDK.
- Sqlite (only for local database)

BENEFIT OF THE PROJECT

Windows 8 is a total re-imagining for the world's favorite OS, built as it is around the Metro UI which, in turn, has been optimized for touch input. Though everything looks sunny on the outside for the new Windows 8, there is still palpable trepidation that users cannot verbally express right because they are still in awe of their new re-imagined OS. We must remember that almost all of Windows denizens have been weaned on the safely familiar Windows 7 interface, since Windows 95 and as expected, are looking for the comfort and ease of use they have become accustomed to in the older versions of Windows.

Now comes a radically new user interface has been built around a phone's interface much like Apple's iOS and has been optimized for tactile input rather than the common keyboard-mouse tandem. Of course, this has been an inevitable shift due to the all too common input combination to the modern and more interactive and natural way of turning ideas to data through touch. This, whilst being good, does have its flaws just the same, which could turn off long-time Windows users, if not properly addressed.

Customer Relationship Management (Construction)

STUDENT NAME: Sudhanshu Sekhar Samal
USN: 1NZ10MCA36   **Year: 2013**
GUIDE NAME: Prof. Krishna Chandra
COMPANY NAME: MicroHill Technologies Pvt. Ltd.

DESCRIPTION OF THE PROJECT

Customer relationship management (CRM) is a widely implemented strategy for managing a company's interactions with customers, clients and sales prospects. It involves using technology to organize, automate, and synchronize business processes—principally sales activities, but also those for marketing, customer service, and technical support. The overall goals are to find, attract, and win new clients, nurture and retain those the company already has, entice former clients back into the fold, and reduce the costs of marketing and client service. Customer relationship management describes a company-wide business strategy including customer-interface departments as well as other departments. Measuring and valuing customer relationships is critical to implementing this strategy.

BI technologies provide historical, current and predictive views of business operations. Common functions of business intelligence technologies are reporting, online analytical processing, analytics, data mining, process mining, complex event processing, business performance management, benchmarking, and text mining and predictive analytics.

Some of the most important features of the software are-

- ➢ Campaign
- ➢ Forecast
- ➢ Lead
- ➢ Account
- ➢ Data management
- ➢ Event
- ➢ Data Importation

SCOPE OF THE STUDY

CRM, or customer relationship management, is concerned with the development and maintenance of mutually beneficial relationships with strategically significant partners. Its focus is the creation of long-term value, and not just short-term profits, for the company and all it works with. The scope of CRM can thus be defined according to its constituencies, how long-term value can be created for and with them and the benefits of doing so.

PROPOSED SYSTEM

There are significant business benefits which accrue from an effective, integrated Customer Relationship Management approach. These include:

- Reduced costs, because the right things are being done (ie., effective and efficient operation).
- Increased customer satisfaction, because they are getting exactly what they want .
- Ensuring that the focus of the organization is external.

- Growth in numbers of customers.
- Maximization of opportunities (eg increased services, referrals, etc.).
- Increased access to a source of market and competitor information.
- Highlighting poor operational processes.
- Long term profitability and sustainability.

METHODOLOGY
Agile Software Development
Agile software development is a group of software development methods based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams. It promotes adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourages rapid and flexible response to change. It is a conceptual framework that promotes foreseen interactions throughout the development cycle.

TECHNICAL DESCRIPTION
MINIMUM HARDWARE REQUIREMENT
- Computer processor   :   Pentium 1V
- Hard Disk   :   40 GB
- RAM   :   512MB
- Display   :   EGA/VGA Color Monitor High Color
- Keyboard   :   Any with minimum required keys

MINIMUM SOFTWARE REQUIREMENT
- Operation System   :   Windows 7
- Business Logic   :   C# in .Net
- Database   :   Sql Server 2005
- Environment   :   Visual Studio 2008

BENEFIT OF THE PROJECT
    The fundamental goal of developing a system is the conformance to requirement specified. This goal is achieved after the implementation of the system. The system is efficient enough to carry out the task it was originally intended to do. The manpower requirement has been reduced and the tasks to be completed are just a few clicks away.

    This system is designed with care to be high user oriented and thus the system was successfully developed and it satisfies the need of the user i.e. Customer. This system is highly flexible and can be used in organization with internet facility. This system is tested perfectly that it can work with the proper input. Error message will be displayed if any unrelated data is entered.

Pathnet General Laboratory - Automation Testing

STUDENT NAME: SUPRIYA M
USN: 1NZ10MCA41   **Year: 2013**
GUIDE NAME: Prof. Govindaraj M
COMPANY NAME: CERNER HEALTH CARE SOLUTIONS

DESCRIPTION OF THE PROJECT

The project entitled "*Pathnet General Laboratory - Automation Testing*" has been undertaken at *Cerner Healthcare Solutions Private Limited*, Bangalore. Test automation is development of an automation software and writing of scripts for running the manual plans in an efficient way. Here, a human intervention is not applicable, so proper validations methods should done in order to increase the quality of the test process. Automation of manual test plan is carried after the test plans are passed manually which is done by a manual tester. To begin with automation of the manual plan, a thorough requirement analysis is carried out with the person who deals with the solution. The work flow of the plan is known from the solution people and scripts will be written based on the workflow of the plan. The scripts are written using proper tools. For this project, all the manual test plans of order management applications are converted to automated scripts. All the objects in the applications are mapped as different objects. Then, these objects are combined with actions to form interaction, which is the core part of automation.

Automated scripts are combined under a main module which is usually the name of the plan. Under the main module, there will be many modules depending on how many steps are in the plan. The main module falls under different modules. Some are Hazard, Primary workflow, Secondary workflow and CHIA, which are major modules.

Automated software will allow the user to predefine actions, compare the results to the expected behavior and report the success or failure of these manual tests to a test engineer. Functionalities of this system are grouped under:

- Task
- Project
- Workspace
- Help

PathNet® General Laboratory fully automates clinical, financial, and managerial processes associated with the chemistry, hematology, coagulation, urinalysis, immunology/serology, and toxicology sections of the clinical laboratory. Like all *PathNet®* applications, *PathNet® General Laboratory* is designed to integrate with all other Cerner systems. The *PathNet® General Laboratory* module of *PathNet®* is an integral part of the Cerner systems common architecture known as *Cerner Millennium*. The *PathNet® General Laboratory* application set is designed to automate the process of healthcare in the general

laboratory areas by reducing turn around times, reducing costs, and improving the quality of patient care.

PathNet® General Laboratory includes functionality to support the departmental workflow including Quality Control (QC), instrument interfaces, result entry and review functions, autoverification, worksheets for the manual areas, and result inquiry. Management report options are available to provide the laboratory manager with information necessary for the day to day operation of the laboratory.

A basic process flow, including *PathNet® Specimen Management* and *PathNet® General Laboratory*, is below. Remember that the testing of the specimen to obtain a result is a small step in the overall process. Specimen Management is included in this diagram because *PathNet® General Laboratory* functions are dependent on the functionality provided by Specimen Management. There are also steps in the entire process flow that are typically outside the control of the laboratory like patient registration, order entry, and charge capture

SCOPE OF THE STUDY
Test automation which automates test manual tests will allow the user to predefine actions, compare the results to the expected behavior and report the success or failure of these manual tests to a test engineer. Many companies have found that automated software testing is an essential component of successful development projects. This system will be used within the organization and its related organizations.

METHODOLOGY
Agile Software Development
Agile software development is a group of software development methods based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams. It promotes adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourages rapid and flexible response to change. It is a conceptual framework that promotes foreseen interactions throughout the development cycle.

TECHNICAL DESCRIPTION

MINIMUM HARDWARE REQUIREMENT

- Computer processor : Pentium 1V
- Hard Disk : 40 GB
- RAM : 512MB
- Display : EGA/VGA Color Monitor High Color
- Keyboard : Any with minimum required keys

MINIMUM SOFTWARE REQUIREMENT

- Operation System : Windows 7
- Business Logic : Java, Cerner Automation Tool
- Database : Cerner DB (Oracle based), XML
- Server : TestComplete, TestExecute
- Environment : Eclipse, Cerner Automation Tool

BENEFIT OF THE PROJECT

The different features of the system are complete enough to automate the Order management applications. It has all the required objects that are present in Order management applications and actions to be performed.

The system is being designed as like it was decided in the design phase. Currently the project is partially Implemented and tested for the partial completeness. Currently this project is still under development and developments are made in increasing the numbers of objects and interactions to increase the wider coverage of numerous applications.

Dynamic customized multicast communicator suit with AES

STUDENT NAME: PRASHANTH M
USN: 1NZ11MCA10   **Year: 2014**
GUIDE NAME: Prof. Nirmala
COMPANY NAME: QCIS Softwares Pvt. Ltd.

DESCRIPTION OF THE PROJECT

Dynamic customized multicast communicator suit with AES allows you to conduct web presentations on the fly, so you can be flexible in your presentations and share any document or application on your computer. Dynamic customized multicast communicator suit with AES is a desktop sharing tool full of features to assist you in conducting the perfect online meeting or web conference. Dynamic customized multicast communicator suit with AES can be employed for a range of professional, academic or personal use.

Online meetings- It provide a very simple and fast way to transmit any screen content across the Web. Whether it be PDF or Word documents, spreadsheets, websites or other software applications, your meeting participants will be able to view your screen actions in real-time and follow you as you host your meeting.

Web conferences- It allows you to conduct web presentations on the fly, so you can be flexible in your presentations and share any document or application on your computer, including presentation files.

Product demonstrations- this feature is very effective for the product based software companies e.g. Microsoft those who have a large no of clients and products. For every new launch or enhancement companies can directly be in touch with their clients.

Web presentations- It is a great way to share your screen in real-time over the Internet with colleagues, clients, friends, or family.

Remote support- Remote Desktop is a remote support tool that enables instant, secure, and trouble-free connections between remote computers over the web and to any point on the globe.

Webinars- A webinar is a neologism to describe a specific type of web conference. It is typically one-way, from the speaker to the audience with limited audience.

EXISTING SYSTEM

Some solutions require additional software to be installed (usually via download) by the presenter **a**nd participants, while others eliminate this step by providing physical hardware or an appliance. In general,

system requirements depend on the vendor. Some web conferencing services vendors provide a complete solution while others enhance existing technologies. Most also provide a means of interfacing with email and calendaring clients in order that customers can plan an event and share information about it, in advance. A participant can be either an individual person or a group. System requirements that allow individuals within a group to participate as individuals (e.g. when an audience participant asks a question) depend on the size of the group. Handling such requirements is often the responsibility of the group. Most vendors also provide either a recorded copy of an event or a means for a subscriber to record an event

Proposed System

Dynamic customized multicast communicator suit with AES is designed by keeping minute details in mind. In the proposed software/application we are integrating many important advance features so as to differentiate it with the traditional applications. The application is designed in such a way that it can be used by professional, academic, or even for personal use.

Some very important features included in the proposed system are Remote Keyboard and Mouse Control that is while sharing your screen; you may assign remote control to a session participant, Session Recording and Playback, advanced Whiteboard and Back Monitor technology to be used, Session Recording and Playback function, 256-Bit AES Encryption, generation of Unique Session ID and Session Password for every session, short cuts to disable remote controls given, application selection and third party access prevention.

SCOPE OF THE STUDY

This product would be web based application designed and developed to target the corporate professional, educational institutes and customers who wants to make online meetings, web conferences, product demonstrations, web presentations, remote support, webinars and advertise or promotions. It helps the user to connect from any were for interacting and transferring information. This software can be used by the big corporate to connect with their large client base for presentations, remote support, product demonstration or promotions thus saving time and generating more business.

Dynamic customized multicast communicator suit with aes is a desktop sharing tool full of features to assist you in conducting the perfect online meeting or web conference. Take advantage of the opportunity to share any screen content or application over the Internet in true color quality with up to 10 participants simultaneously, while still sitting at your desk.

METHODOLOGY
Agile Software Development
Agile software development is a group of software development methods based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams. It promotes adaptive planning, evolutionary development and

delivery, a time-boxed iterative approach, and encourages rapid and flexible response to change. It is a conceptual framework that promotes foreseen interactions throughout the development cycle.

TECHNICAL DESCRIPTION

Minimum Hardware Requirement

Processor : Pentium IV

Hard Disk : 160 GB

RAM : 1 GB

Monitor : 15" color

Minimum Software Requirement

Technology : Cloud based

Platform : Windows 2000, XP, NT

Languages : HTML, JavaScript, J2EE, JSP, Hibernet, Servlet,AJAX

Databases : MySQL

Supporting Server : Apache Tomcat 5.5

BENEFIT OF THE PROJECT

The application allows real-time point-to-point communications as well as multicast communications from one sender to many receivers. It offers information of text-based messages, voice and video chat to be shared simultaneously, across geographically dispersed locations. Applications for web conferencing include meetings, training events, lectures, or short presentations from any computer.

Application provides a means of interfacing with email and calendaring clients in order that customers can plan an event and share information about it, in advance. Most vendors also provide either a recorded copy of an event or a means for a subscriber to record an event. Support for planning a shared event is typically integrated with calendar and email applications.

PRODUCT PROMOTION UTILITY

STUDENT NAME: Shreyas V
USN: 1NZ11MCA30   **Year: 2014**
GUIDE NAME: Prof. Meena Kumari
COMPANY NAME: icreate software

DESCRIPTION OF THE PROJECT

Problem Statement:

Biz$core Product comes bundled with several pre-configured metadata about the various components involved in the solution. At onset, the product gets deployed and configured in a development environment. The subsequent movement of **product** into test and Production environments require manual duplicate effort for each movement.

Proposed Solution Overview:

To eliminate or to reduce effort overhead, the **proposed promotion utility** will help deployment of preconfigured metadata from one environment to other in an automated fashion.

The product when deployed in development environment, is configured with various setting in web application, database, ETL jobs, and reports. These configurations are wrapped as metadata and used in subsequent test phase, to reduce the duplication of the configuration effort. It would help in faster deployment of product in client environment.

If configurations are not according to the user requirement, it is modified and process repeats before transferring to next deployment stage. Once the test phase completes, the utility package would wrap the metadata of the configuration from the Test environment and move to the Production environment for actual deployment. This serves as basic product metadata set for the client in consideration.

The following modules of the Biz$core platform have been identified as candidates for inclusion in Product Promotion Utility:

Modules:

➢ **User Management**

The user management feature helps to manage the users, the groups to which the users belong, and the content that the users work with. Only an administrator or a user with administrator privileges can access the user management feature. Administrators create users and roles to maintain levels of security for the data that is available for different users to view, modify, and delete.

➢ **Review Process Flow**

The review process flow allows you to define multiple levels of review that an artefact must go through before being authorized. The review process flow is a Maker-Checker concept. It allows a particular artefact to move from one user to the other or from one department to the other for reviewing. These artefacts can be approved or rejected during the review process.

To maintain an audit trail, the review process flow includes multiple stages at which meaningful data is captured.

Some of the data that the system captures are as follows:

● Date and time of creating or modifying the artefact

● Data that is changed in the artefact

● Nature of the changes made to the artefact

In this module we can design workflows, assign privileges at each level of the workflow on who can act. New features to help in managing the review process flow tasks and help the user to manage and efficiently handle various scenarios of assigning/UN assigning/Cancelling a particular task.

➢ **Reference Code Management**

A reference code refers to commonly used codes such as population codes, district codes, BSR codes, currency codes and industry codes that have a specific set of values and descriptions. Many such codes are used in statutory reports such as those required by the Central Bank.

Reference codes can change over a period of time when the Central Bank decides this is necessary. When this happens, codes in reports have to be changed accordingly. A feature to change reference codes centrally is available in the application and this eliminates the need to change the reference codes in individual reports and dashboards.

Reference codes can be added, modified, and deleted using the Reference Code Management Table Using the reference code table management feature, you can:

Manage the schema of the reference code table.

Manage the data in the reference code table.

EXISTING SYSTEM

As Banks are major client for this product, they does not allow access to their database. So we are developing such packages which contains metadata that helps the bank's production department to reduce their complexities to install and maintain the product.

Biz$core is an integrated Business Intelligence (BI) and Performance Management solution designed specifically for the Banking sector. With in-built data models, packaged content, and integrated

Extraction, Transformation, and Load (ETL) infrastructure, Biz$core addresses the need for an easy and quick-to-implement BI solution.

Biz$core Product comes bundled with several pre-configured metadata about the various components involved in the solution. At onset, the product gets deployed and configured in a development environment. The subsequent movement of **product** into test and Production environments require manual duplicate effort for each movement.

Proposed System

To eliminate or to reduce effort overhead, the **proposed promotion utility** will help deployment of preconfigured metadata from one environment to other in an automated fashion.

The product when deployed in development environment, is configured with various setting in web application, database, ETL jobs, and reports. These configurations are wrapped as metadata and used in subsequent test phase, to reduce the duplication of the configuration effort. It would help in faster deployment of product in client environment.

If configurations are not according to the user requirement, it is modified and process repeats before transferring to next deployment stage.

Once the test phase completes, the utility package would wrap the metadata of the configuration from the Test environment and move to the Production environment for actual deployment. This serves as basic product metadata set for the client in consideration

SCOPE

Biz$core is an integrated Business Intelligence (BI) and Performance Management solution designed specifically for the Banking sector. With in-built data models, packaged content, and integrated Extraction, Transformation, and Load (ETL) infrastructure, Biz$core addresses the need for an easy and quick-to-implement BI solution.

With a domain-based approach, Biz$core is a unique product of its kind in the BI space. With its complete focus and deep knowledge of banking domain, the product is best suited to meet the BI needs of a bank.

The Biz$core solutions are architected in a way that they can be deployed separately or together to ensure that the solution deployment matches with the organization structure and unique priorities of the Bank. Each solution comes together with an arsenal of Dashboards, Reports, Analysis templates, Alerts and best practice KPIs each aiding a deeper understanding of the Business and enabling decision making.

METHODOLOGY

Agile Software Development

Agile software development is a group of software development methods based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams. It promotes adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourages rapid and flexible response to change. It is a conceptual framework that promotes foreseen interactions throughout the development cycle.

TECHNICAL DESCRIPTION

Minimum Hardware Requirement

RAM   :   4GB
HDD   :   250GB and above
Processor   :   Core i3 2.20GHz

Minimum Software Requirement

Development tool   :   Eclipse
Server   :   Apache tomcat
Database   :   Oracle 11g
Reporting and ETL   :   MSTR Informatica

BENEFIT OF THE PROJECT

The fundamental goal of developing a system is the conformance to requirement specified. This goal is achieved after the implementation of the system. The system is efficient enough to carry out the task it was originally intended to do. The manpower requirement has been reduced, more organize and the tasks to be completed are just a few clicks away.

Maker-checker – one of the central principles of authorization in the Information Systems of financial organizations, states that key activities should be undertaken by more than just one person to reduce the risk of misjudgment and misuse. Maker-checker plays a crucial role in the context of Risk Management in banks. Banks have been traditionally using rating models to assess credit-worthiness of potential as well as existing obligors, through an established process of credit appraisal that has developed and evolved over time. The rating process reflects the risk in the transaction and would be an evaluation of the obligor's intrinsic strength to reply the loan. These rating models may be statistical or judgmental in design, and are used extensively to guide a wide range of decisions pertaining to loan origination, account management, pricing, strategy, etc.

Database Hardening Automation

STUDENT NAME: Asmita Banerjee
USN: 1NH12MCA18   **Year: 2015**
GUIDE NAME: Prof. S P Sreeja
COMPANY NAME: Cerner Health Care Solutions

DESCRIPTION OF THE PROJECT

Database solidifying mechanization instrument will minimize the endeavors of manual work with takes up to 4 hours to couple of minutes. This apparatus can help to come close Cernerworks standard variables and created database particular reports. This device is intended to minimize the human effort. The Database tool is a critical to guide our quality development strategy, and it will focus efforts to achieve the CernerWorks vision 99.99% uptime for all clients.

The tool will be an internal tool within CernerWorks Ops which helps all Database administrators to implement the standards flawlessly. The tool is based on technologies like Shell scripting, C# and HTML.

C# and HTML will be used for front end design. Shell scripting will be used for backend of the project. A shell scripting is a computer program designed to be run by the UNIX shell, a command line interpreter.

The various dialects of shell scripts are considered to be scripting languages. Typical operations performed by shell scripts include file manipulation, program execution, and printing text.

EXISTING SYSTEM

Firstly, we will bargain about solidifying the hidden working framework environment. This is an at last fundamental step towards application layer security, since likewise the best security mechanism and design won't be valuable if the entire framework is attackable one layer past the genuine target application. Working framework solidifying incorporates setting right file system authorizations, the outline and usage of a virtual chroot-penitentiary application executing environment, the utilization of access control records and also a speedy presentation about current virtualization approaches.

The following subject will be about cryptography, which we will use to help and secure our database case at file system level and, perhaps considerably more critical, the DMBS' correspondence channels. This will be accomplished utilizing OpenSSL, OpenSSH or OpenVPN. For encoding the crude database pages themselves, we'll likewise examine file system encryption.

Because of some very awful security bugs before, we'll examine how the application's memory region can be secured against stack- and store crushing assaults for executing subjective code on the machine which really executes the MySQL database server.

At that point we'll examine certain security-related MySQL setup properties. MySQL is straight to design, however by the by there are a couple of choices which inside the arrangement records which make life simpler - and more secure.

LIMITATION
- Limited till use of Cernerworks.
- Limited for use of DBA's.

PROPOSED SYSTEM

The Database device is a basic to guide our quality advancement methodology, and it will center endeavors to accomplish the CernerWorks vision 99.99% uptime for all customers. The apparatus will be an inside device inside CernerWorks Ops which helps all Database chairman to execute the guidelines impeccable.
- Database hardening robotization mechanical assembly will minimize the attempts of manual work with takes up to 4 hours to couple of minutes.
- This instrument can help to measure up Cernerworks standard variables and made database specific reports.
- This instrument is planned to minimize the human error.

SCOPE

Database solidifying robotization mechanical gathering will minimize the endeavors of manual work with takes up to 4 hours to couple of minutes. This instrument can help to measure up Cernerworks standard variables and made database particular reports. This instrument is wanted to minimize the human blunder. The Database device is a key to guide our quality progress framework, and it will center endeavors to complete the CernerWorks vision 99.99% uptime for all customers. The contraption will be an inside device inside CernerWorks Ops which helps all Database director to execute the guidelines.

METHODOLOGY
- Started working with the idea to minimize the effort of DBA's.
- Started with rough sketch, design the model, developed with c#.
- Connect the backend using ssh.
- Executed command in backend and fetch the result in frontend.

TECHNICAL DESCRIPTION

Hardware Requirement
- RAM: 256 MB
- Hard Disk: 100 MB
- Computer: Pentium 450 MHZ minimum

Software Requirement
- O.S.: Windows
- Software: Rencissh.net for backend connection, Oracle11g for database connection

BENEFITS OF THE PROJECT

Database hardening automation tool will minimize the efforts of manual work with takes up to 4 hours to few minutes. This tool can help to compare Cernerworks standard variables and generated a database specific report. This tool is designed to minimize the human error. The Database tool is a critical to guide our quality development strategy, and it will focus efforts to achieve the CernerWorks vision 99.99% uptime for all clients. The tool will be an internal tool within CernerWorks Ops which helps all Database administrator to implement the standards flawlessly .The tool is based on technologies like Shell scripting, C# and HTML. C# and HTML will be used for front end design. Shell scripting will be used for backend of the project. A shell scripting is a computer program designed to be run by the UNIX shell, a command line interpreter. The various dialects of shell scripts are considered to be scripting languages. Typical operations performed by shell scripts include file manipulation, program execution, and printing text.

ENHANCED HIGHEST LEVEL INFORMATION CONCEALMENT TOOLS WITH ALGORITHMS & EKM

STUDENT NAME: SUDAMA LOKSHMAN
USN: 1NZ12MCA58 **Year: 2015**
GUIDE NAME: Prof.Nithya Ramesh
COMPANY NAME: Fincore Softwares

DESCRIPTION OF THE PROJECT

The project entitled "Enhanced highest level information concealment tool with algorithms & EKM" is a software for establishing and maintaining an on-the-fly-encrypted volume (data storage device). On-the-fly encryption means that data is automatically encrypted right before it is saved and decrypted right after it is loaded, without any client mediation. No information stored on an encrypted volume can be read (decrypted) without using the correct password/key file(s) or correct encryption keys. Entire file system is encrypted (e.g., file names, folder names, contents of every documents, free space, Meta information, etc).

Encryption provides the highest level of security and protection, because all files, including any temporary files that Windows and applications create on the system partition (normally, without our knowledge or assent), hibernation documents, swap files, etc., are always permanently encrypted (even when power supply is suddenly interrupted). Windows also likewise records a lot of possible amounts of potentially sensitive data such as names and locations of files we open, applications we run etc. All such log files and registry entries are permanently encrypted too**.**

Files can be copied to and from a mounted application volume just like they are copied to/from any normal disk (for example, by simple drag-and-drop operations). Records are automatically being decrypted on the fly (in memory/RAM) while they are being read or copied from an encrypted application volume. Similarly, Documents that are being written or copied to the application volume are automatically being encrypted on the fly (right before they are written to the disk) in RAM. Note that this does *not* mean that the while file that is to be encrypted/decrypted must be stored in RAM before it can be encrypted & decrypted. No extra memory needed for application. Application can on-the-fly encrypts a system partition or entire system.

EXISTING SYSTEM

There are some traditional existing small applications but each one has a problem. With new ideas and full market survey designing this leading software application. Some of limitations are the complexity of PC encryption, the typically, costly cost, the ability for it to be easily changed and its inability to organize the data has been encoded.

Another drawback is that not only is it very expensive to encrypt and decrypt power but it also takes major of handling, energy and PC power as well. This implies that despite the fact that information is secure the general execution of the PC could drop.

PROPOSED SYSTEM

Steganography is beneficial for securely storing sensitive data, such as hiding key or system passwords within other files. However, it can also pose serious problems because it's difficult to detect. Network surveillance and monitoring systems will not flag messages or files that contain steganographic data. Therefore, if someone attempted to steal confidential data, they could conceal it within another file and send it in an innocent looking email.

Application software is designed by keeping minute details in mind. In the proposed software we are integrating many important advance features so as to differentiate it with the traditional applications. Some very important features included in the proposed system are System encryption, virtual encrypted disk, Parallelization and steganography.

Some more advantages of proposed system are-
- Secure Outsourcing and Licensing
- Encryption Allows You to Secure Your Remote Offices
- Encryption Provides Confidence That Your Backups Are Safe
- Encryption Helps You Meet Regulations -Encryption Helps Move to the Cloud

TECHNICAL DESCRIPTION

Hardware Requirement
- Processor: Intel dual core
- RAM: 512 MB
- Hard Disk: 500 MB
- Computer: Pentium 450 MHZ minimum

Software Requirement
- Platform: Windows 7
- Language: Java, j2ee
- Database: MySQL
- Browser: Internet Explorer 9.0, Chrome etc.
- Supporting Server: Apache Tomcat 6.0

BENEFITS OF THE PROJECT

"Enhance highest level information concealment tools with algorithms & EKM" provides a mature security solution that not only allows users to create encrypted containers and map them into their system environments as if they were physical drives, but also permits encrypting an entire system

partition or hard drive. This means that all of the data on the hard drive, including temporary files, will always be encrypted using the algorithm.

System encryption involves pre-boot authentication, which means that anyone who wants to gain access and use the encrypted system, read and write files stored on the system drive, etc., will need to enter the correct password each time before Windows boots (starts). Pre-boot authentication is handled by the Application Loader, which resides in the first track of the boot drive and on the Application Rescue Disk.

SaaS Based Business Automation Tool with Report Dashboard

STUDENT NAME: Vipin Chauhan
USN: 1NZ12MCA79 Year: 2015
GUIDE NAME: Prof. Binoj M
COMPANY NAME: Semantic Tech Labs

DESCRIPTION OF THE PROJECT

Application software is designed to handle time and expense tracking & billing, undertaking administration, archive documenting, and scheduling for firms who bill for their time. Application software is a hosted system, which means that the data is stored and processed at our secure data center. Software is fully secured with 128-bit SSL encryption. Our application fulfills the following –

1) User Experience Monitoring -.Recognizing how the clients are interfacing with your application is the key highlight any application engineer might want to see in an observing apparatus, where continuous examination and insights identified with clients' encounters of connection with an application help to distinguish execution issues.

2) Ease of Use and Low Complexity - SaaS based Web Application Performance Management and Monitoring devices gave as an administration must be anything but difficult to use for application supervisors and all different operations staff with the goal that they can productively upgrade the execution of their application.

3) Scalability Analysis & Projection - A Scalability Analysis and Projection system in SaaS Application Performance Monitoring device gives application proprietors the capacity to get shrewd information on the usage of PC assets by their application.

4) Tracking Web Transactions and Application Analytics - A SaaS Application Performance Monitoring apparatus needs to be brilliant in distinguishing the reaction time, blunder rates and other discriminating data to increase auspicious understanding into all the execution bottlenecks an application is encountering.

5) Application Availability - Application accessibility ought to be a prime sympathy toward any application designer. Designers must guarantee that their application stays experience 24/7 regardless of the possibility that unattended.

EXISTING SYSTEM

There are some conventional existing little applications yet everyone has a point of confinement. As the progression of the innovation and business we require an application where we have all the propelled highlights the organizations are searching for. With new thoughts and full market overview we are planning this driving programming application. Applications right now accessible are not supporting cloud stage and they are organization particular.

PROPOSED SYSTEM

Application is planned by remembering moment subtle elements. In the proposed programming we are incorporating numerous critical development highlights to separate it with the customary applications. The application is diagram in such a path, to the point that it can be utilized by little business, specialists or huge corporate.

Some imperative highlights included in the proposed framework are –

- Create project clumps to accelerate the project creation process
- several project designs & diagrams
- Export LEDES electronic projects
- Export Litigation Advisor Electronics Invoices
- Memorize usually run report and channel blends
- Powerful channels and choices for every report
- Flexible charging rates and charging blends
- Separate reporting for charged and unbilled movement
- Customizable project mental helper

Information is put away in a safe SAS70 Type II Certified server farm and exceptionally configurable client benefit settings. Application is anything but difficult to utilize and highlight rich. Access it from anyplace utilizing a PC, tablet, laptop, iPad, or Smartphone.

TECHNICAL DESCRIPTION

Hardware Requirement

- Processor : Pentium(R) Dual-Core and above
- Memory size : 2.00GB RAM
- System Type : 32-bit Operating System
- Storage : 10GB Minimum

Software Requirement

- Front End : Java
- Back End : Sql server 2014/Oracle 11g
- Operating System : Windows
- Browser : Internet Explorer 9.0
- Environment : Windows 7

BENEFITS OF THE PROJECT

This software helps improve customer service discernment and fulfillment, increase availability through a single purpose of contact, correspondence, and data, increase efficiency of support staff via automating processes, strategies, and assignments (tasks), Reduce IT support costs. The distinctive modules of the project are sufficiently enough to manage and handle the general procedure of invoicing/billing, records payable, multi-project management, out sourcing timetable management, bank compromise and accounting. This application can be utilized with diverse space organizations.

- All around actualized system can enhance supplier and purchaser connections by making the installments transform more solid.
- Application can make noteworthy inward cost investment funds for the business by streamlining the receipt installment process.
- Payment-related data can be supplied specifically from the framework into management reports as a component of a more extensive management information system.

SERVER RECLAIM TOOL

STUDENT NAME: M.M. SHARIN
USN: 1NH12MCA49   **Year: 2015**
GUIDE NAME: Prof. Vishwanatha C R
COMPANY NAME: Cerner Health Care Solutions

DESCRIPTION OF THE PROJECT

The project entitled **Server Reclaim Tool** is a business analysis application designed to deliver a platform for the organization as a whole, which enables continuous improvement of individual associate, team and improves data integrity. This business analysis application Server Reclaim Tool will be the part of organization standard tool for performing the reclaim of servers. This application is aimed at delivering a new standard in the management enabling to become a leader in the market.

Flawless execution being our motto here at CernerWorks (CWx), it totally depends on pre-checks (which includes approvals of Production Owner (PO), PMO) and visibility of data. 19000+ servers in 2015 is a huge task ahead for us at CernerWorks (CWx) and we want to make sure that we make all the changes/improvements to achieve this target flawlessly. The application is a critical tool to guide our quality development strategy, and it will focus efforts to achieve the Cerner vision 99.99% uptime for all clients. The application will be an internal tool within CernerWorks Client Ops which helps the managers and executives in re-using the servers for an optimum usage and the betterment of the organization.

This business analysis application is developed using C# ASP.NET. Active Server Pages (ASP), also known as Classic ASP, was introduced in 1998 as Microsoft's first server side scripting engine.ASP is a technology that enables scripts in web pages to be executed by an Internet server.

Top benefits that executives expect to derive from business analytics application includes improving the decision-making process, betterment of resources with strategies, reducing the total cost of ownership which is one of the main mantra of CERNER and also responding to user needs for availability of data on a timely basis.

EXISTING SYSTEM

The reclaims process is very dynamic and interrelated to various systems/servers as such the problem we are seeing today are as below:

- 19000 of Servers to be reclaimed by 2015 is not an easy task given the amount of time PO's take to associate a server to PMO reclaims domain and the check they need to perform before associating.
- The same amount is time is required by PMO team to do pre-checks for each and every server individually before raising a CR, which includes server status, association, prod/non prod status, Client side information and whether Contracted or not,
- Lastly the SE's to take the same amount of time to the pre-checks individually for each server before going ahead and reclaiming the server as per the WI (Work Information or Work Plan).

- The Servers which must not be reclaimed are sometimes moved to the PMO reclaim domain, it becomes difficult for the PO to contact the right person to stop or update information. We have seen happening time and again.
- Right now the only way to get to know the information on the particular CI (Change Information) is through Remedy (Tool which holds all Server and Client related Information), which is tedious given the amount of time it takes to access (from login to Remedy to getting information) and number of servers we are reclaiming, there is no quick solution for this today.

PROPOSED SYSTEM

This tool is also intended to be used them by the PO, PMO team and other stakeholders to also know the status on the CI or servers which is being reclaimed. This tool will surely ease the pre-check activity and bridge the information visibility gap for PO, SE's and PMO teams.

TECHNICAL DESCRIPTION

Hardware Requirement

- Processor : Pentium(R) Dual-Core and above
- Memory size : 2.00GB RAM
- System Type : 32-bit Operating System
- Storage : 10GB Minimum

Software Requirement

- Technology : C#, ASP.NET
- Tool : Front-End: C# ASP.Net using IDE Visual Studio 2012, Back-End : SQL Database.

BENEFITS OF THE PROJECT

The fundamental goal of developing a system is the conformance to requirement specified. This goal is achieved after the implementation of the system. The system is efficient enough to carry out the task it was originally intended to do. The maximum consumption of time has been reduced, more organized and the tasks to be completed are just a few clicks away.

This **Server Reclaim Tool** is designed with care to be high user oriented and thus the system was successfully developed and it satisfies the need of the organization leadership in many ways. This tool has also been helpful in reducing the time consumption of an SE. This application is very user friendly and is helping the management in easy understanding of voluminous data and ultimately in gathering all the necessary information related to reclaim a tool at one place. This system is tested perfectly that it can work with the proper input. Error message will be displayed if any unrelated data is entered.

Interactive Learning Intelligent System

Student: Mr. Umesha. B

Guide: Dr. V. Ilango,

Professor & HoD, Department of Computer Applications

New Horizon College of Engineering

Bangalore-560 103

Manual For iLiS

Developed By Umesh

ACKNOWLEDGEMENT

The Satisfaction that accompanies the successful completion of any task would be incomplete without mentioning of all the people who made it possible, whose constant guidance and encouragement crown all the efforts with success.

Our Interactive Learning Information System was possible only because of the encouragement we received from all quarters. We take this opportunity to thank Shri Mohan Manghnani, Chairman of New Horizon Educational Institutions and Prof T.N Basavaraj, Principal of New Horizon College of Engineering for their unwavering moral support throughout the evolution of the project.

We thank our Guide Prof. V.Ilango, Dept of Master of Computer Applications for his Valuable Suggestions and feedback during the course of the project.

The project was able to gain momentum through the helpful discussion and the interesting improvements suggested by our classmates. Finally we thank all our friends, well-wishers and teachers without whose support and encouragement we would have never reached this far.

Umesha .B

Introduction:

ILIS (Interactive Learning Intelligent System) is software which is used for quiz computation. It is easy to use for quiz computation in the school and college level. ILIS software contains type of quiz computations such as General Quiz, Code Quiz, Image Quiz, Audio and Video Quiz. From ILIS software the Questions and Answers will be secured. This is more attractive software for participants.

ILIS is different Quiz software were we can see the different type of quiz computations like Text based questions and video, audio, image format of question, it encourages the participants to participate in quiz computation. It is Open Quiz software which allows you to discuss on particular questions for sharing the extra knowledge.

Objectives:

Promoting Information and communication technology and their utilization.
Motivating young talent mind to develop utility software.
To encourage students to begin an entrepreneur.

Scope:

The target user is school children's (primary, secondary, higher secondary).

Other professional institute student like engineering, science and etc also can be utilize this for interactive learning.

Any organization employees also can utilize this package, who is keen to learn.

Limitations:

Admin can only insert, manipulate data and register the teams.

Audio Quiz only limited for MP3 format.

Video Quiz only limited for MPEG format.

There is no option for printing the generated report.

Feature Enhancement:

ILIS software can be enhanced as web based.

Audio and video can be supported for multi format.

Can be make it as support for multi language.

Can be make it as support for multi platform.

Make it as descriptive learning.

Technical Requirements:

Software Requirements:

JRE (Java Runtime Environment)

JMF (Java Media Framework)

Windows XP Operating System.

Hardware Requirements:

Processor P4 and Above.

RAM 256Mb and above.

Quiz Types

- **General Quiz**

General Quiz is text based (software engineering, Testing etc) questions which does not suite the Code based questions. Here each question having four options in that chose one correct answer. Every correct answer have pointes. Pointes display in the Score Board.

Click Start button to begin the Quiz. Each question having four answer options in that correct answer option is choose by clicking the Answer button. If you like to stop time in between the quiz for any more discussion than click Pause button than after you resume time by clicking on Play button. To increase font size click A+ button and to decrease font size click A-.

 Code Quiz

Code Quiz is Code (c, c++, java etc) based questions. Here each question having four options in that chose one correct answer. Every correct answer have pointes. Pointes display in the Score Board.

Click Start button to begin the Quiz. Each question having four answer options in that correct answer option is choose by clicking the Answer button. If you like to stop time in between the quiz for any more discussion than click Pause button than after you resume time by clicking on Play button. To increase font size click A+ button and to decrease font size click A-.

- Image Quiz
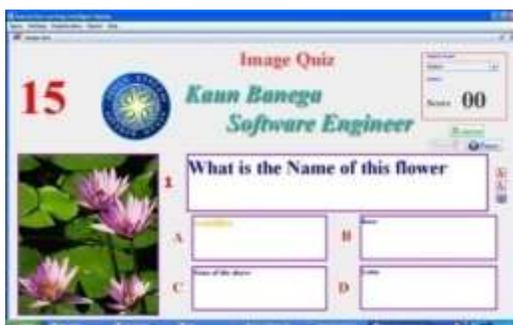
Image Quiz is Image based questions. Here each question having four options in that chose one correct answer. It Show the Preview of the Image and Score of the Selected Team. Wrong answer show in Red Color.

Click Start button to begin the Quiz. Each question having four answer options in that correct answer option is choose by clicking the Answer button. If you like to stop time in between the quiz for any more discussion than click Pause button than after you resume time by clicking on Play button. To increase font size click A+ button and to decrease font size click A-.

- Audio Quiz

Audio Quiz is Voice based questions. Here each question having four options in that chose one correct answer. Audio can Control using given Controller bar(Play, Pause).

Click Start button to begin the Quiz. Each question having four answer options in that correct answer option is choose by clicking the Answer button. If you like to stop time in between the quiz for any more discussion than click Pause button than after you resume time by clicking on Play button. To increase font size click A+ button and to decrease font size click A-.

- Video Quiz

In Video Quiz each question having four options in that chose one correct answer. Video can Control using given Controller bar(Play, Pause).

Click Start button to begin the Quiz. Each question having four answer options in that correct answer option is choose by clicking the Answer button. If you like to stop time in between the quiz for any more discussion than click Pause button than after you resume time by clicking on Play button. To increase font size click A+ button and to decrease font size click A-.

⏹ Adding Records

⏹ General
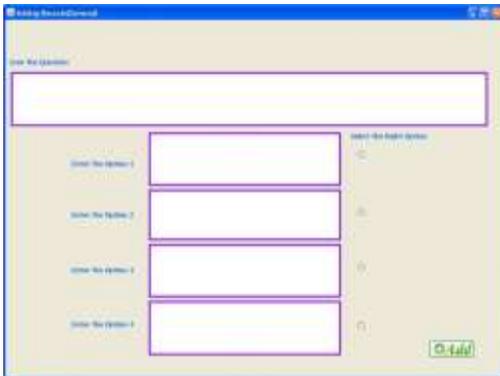
This form allows you to Add General Quiz questions and four answer options in that choose the right answer by selecting any one radio button. There is no choice of multiple answers. The Fields can be empty if any one field is empty the error message will be display. After entering all fields click Add button.

⏹ Code
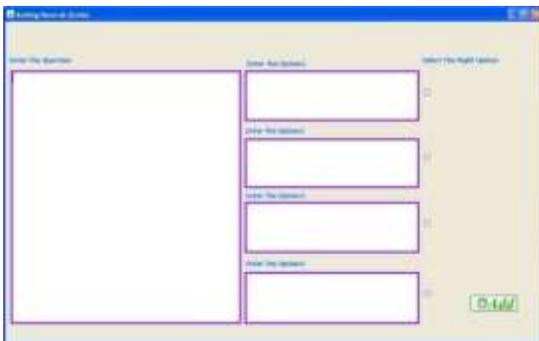
This form allows you to Add Code Quiz questions and four answer options in that choose the right answer by selecting any one radio button. There is no choice of multiple answers. The Fields cannot be empty if any one field is empty the error message will be display. After entering all fields click Add button.

Image
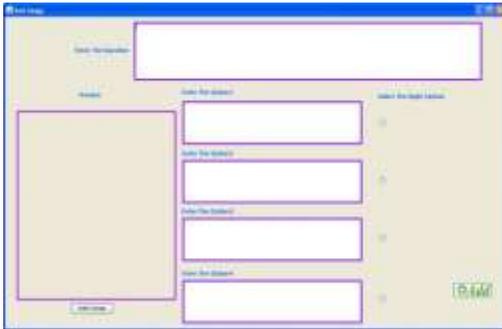
This form allows you to Add Image Quiz questions and four answer options in that choose the right answer by selecting any one radio button. There is no choice of multiple answers. The Fields cannot be empty if any one field is empty the error message will be display. After entering all fields click Add button.

- Audio
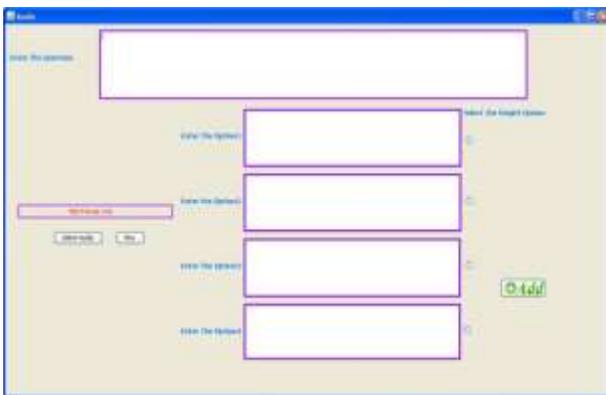
This form allows you to Add Audio (The Audio must be in MP3 format only) Quiz questions and four answer options in that choose the right answer by selecting any one radio button. There is no choice of multiple answers. The Fields cannot be empty if any one field is empty the error message will be display. After entering all fields click Add button.

- Video
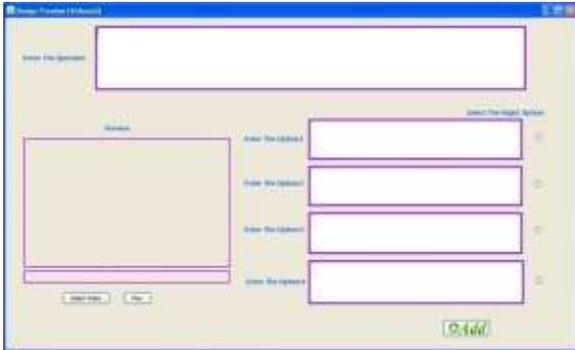
This form allows you to Add Video(The Video must be in MPEG format only) Quiz questions and four answer options in that choose the right answer by selecting any one radio button. There is no choice of multiple answers. The Fields cannot be empty if any one field is empty the error message will be display. After entering all fields click Add button. Here you can resize the video size by clicking the max button.

● Delete Records

- General, Code, Image, Audio & Video

This form allows you to delete records from the database. The options like next and previous buttons to navigate from one question to another. By clicking Delete button you can delete the records. It also displays the total number of records.

● Update Records

- General, Code, Image, Audio & Video

This form allows you to Update records from the database. The options like next and previous buttons to navigate from one question to another. By clicking Update button you can Update the records. It also displays the total number of records.

● Change Password

This form allows Admin to change the password. Here the Username cannot be changed; default username is "Admin".

- **Set Countdown time**

This form allows you to set the countdown time. And you can also see the existing time by clicking the Show button.

- **Set Title and Logo**
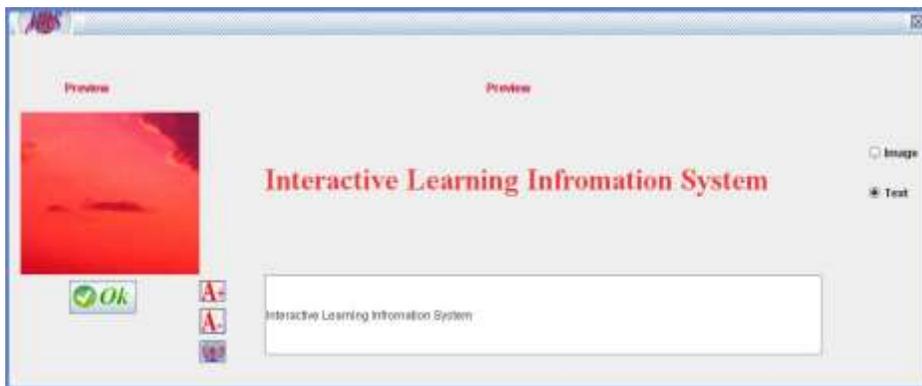
This form allows you to set the logo and title for General and Code quiz. Title can be set in two ways text or image; you cannot set both text and image.

- **Set Marks**
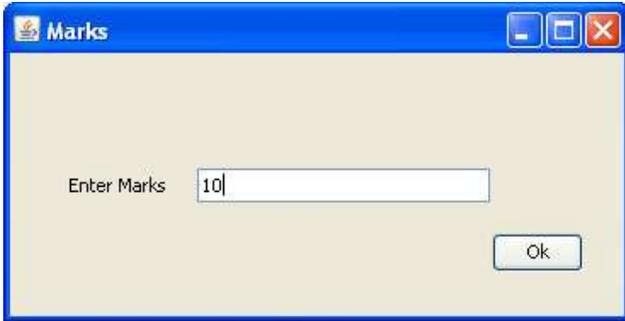
This form allows you to set Marks for every right answer.

Registration form:
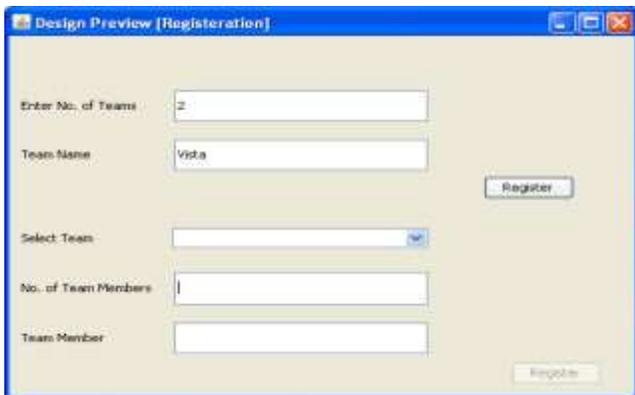
This form allows you to register total number of teams and Name of the Team. Register Button is used for registration. Once you register the total number of team with team name then you will get name of the teams in drop down list. Select any one team name and allows you to enter the total number of members in a team with member names.

Report:
In this two types of reports
Scoreboard
Team
Scoreboard:
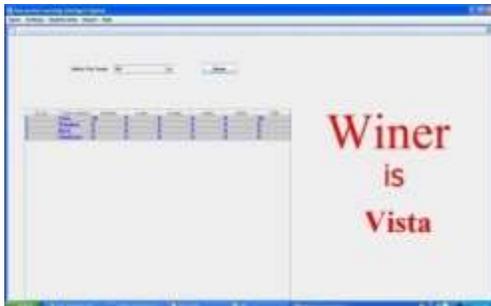
In this form you can able to watch the Score of individual team also winning team score of all type quizzes.

Team:

In this form you can able to see the team members name.

NEW HORIZON COLLEGE OF ENGINEERING
DEPARTMENT OF BIOTECHNOLOGY

Inventions for Filing Provisional (Indian) Patent Applications
Category: Institutional Patent

Type of Patent: Process and Product

TITLE OF THE INVENTION: "Turmeric powder (*Curcuma longa Linn.*) based novel plant tissue culture media by means of enhanced callus inducing and anti fungal abilities".

INVENTORS:
R.S. Upendra[1*] and Pratima Khandelwal[2,]
[1*]Sr. Asst. professor, [2]Professor & Head, Department of Biotechnology

PATENT HOLDER'S ADDRESS:

New Horizon College of Engineering (Autonomous), Bangalore 560 103, Karnataka, India

ABSTRACT OF THE INVENTION: A novel process was developed for developing a novel plant tissue culture media (MS media) supplemented with the turmeric powder a well-known antifungal agent, as a natural callus inducing and antimicrobial agent. Successful attempts were made to induce a process of dedifferentiation to enhance the formation of callus and avoid fungal contamination using the MS media supplemented with various concentration of turmeric powder. Results of the new study revealed that turmeric powder used at the concentrations of 0.8 – 1.0 g/L in the media resulted in achieving the appreciable amount of the callus and also controls the fungal contamination for two months.

CLAIMS OF THE INVENTION:

- First ever study to report turmeric powder, a well-known antifungal agent, for use as a natural callus inducing along with well established antimicrobial property in plant tissue culture media.
- A new design and development of a plant tissue culture media (MS media supplemented with Turmeric powder) for enhancing the callus growth and also to avoid fungal contamination.

Keywords: *Turmeric, Curcumin, callus inducing agent, antimicrobial compound*

TITLE OF THE INVENTION: "Design and fabrication of anaerobic bioreactor for the production of Bioethanol from Agriculture waste (Field beans/Green Pea pods waste)".

INVENTORS:
R.S. Upendra[1*] and Pratima Khandelwal[2,] Priyanka.S[3], Jagadish M L[3], Nandhini N J[3].
[1*]Sr. Asst. Professor, [2]Professor & Head, Department of Biotechnology, [3] BE (Biotechnology), Graduates

PATENT HOLDER'S ADDRESS:
New Horizon College of Engineering (Autonomous), Bangalore 560 103, Karnataka, India

ABSTRACT OF THE INVENTION: A tropical country suited low cost anaerobic fermentor was designed and fabricated for Bioethanol production under submerged culture conditions using yeast and agro waste biomass namely abundantly available field bean pods, field bean seed coat and green pea's pods) as substrates. The latter were pre-treated and saccharified using consortium of fungal strains (*Aspergillus sp.*). On completion of the process, glucose obtained (90g of glucose/ kg) was taken for the SmF process using *Saccharomyces cerevisiae* and the end product ethanol was estimated qualitatively and quantitatively by specific gravity method, 7.725g in comparison with the weight of pure ethanol 7.639 and Gas Chromatography (70.2% ethanol). A conversion rate of 250 ml of ethanol/kg of agro waste was calculated. The spent yeast was dried (50g/l) and used as peptone.

CLAIM(S) OF THE INVENTION:

- A suitable low cost anaerobic fermentor was designed and fabricated for Bioethanol production under submerged culture conditions using Yeast (*Saccharomyces cerevisiae)*.

Keywords: Agro-Waste, Bioethanol, Aspergillus sp., Saccharomyces cerevisiae, anaerobic fermentor.

TITLE OF THE INVENTION: "Optimization of fluoride removal system using immobilized *Ocimum sp* leaves and Ragi seed husk by applying Bio-statistical tools"

INVENTORS: R.S. Upendra[1*] and Pratima Khandelwal[1] Amulya Achar[2], Kumari.B.G[2], Sowmaya.M[2], Tejaswini.J[2]
[1]Faculty members, Department of Biotechnology, [2] BE (Biotechnology), Graduates (2010-2014)

PATENT HOLDER'S ADDRESS:
New Horizon College of Engineering (Autonomous), Bangalore 560 103, Karnataka, India

ABSTRACT OF THE INVENTION:

A novel economically viable, eco-friendly and easy method for defluoridation of drinking water was developed using immobilized *Ocimum sp* leaves along with ragi seed husk beads as natural fluoride adsorbents and the process parameters such as absorbent dosage (1-10 g/l), pH (3-12) and contact time (10-150 min) were optimized using Central Composite Design (CCD) of Response Surface Methodology (RSM). The fluoride content in the water was quantitatively determined by UV spectrophotometric analysis and the presence of fluoride in the treated *Ocimum sp* leaves were identified with EDAX analysis. RSM design optimized conditions i.e - 5.5 g/l each of *Ocimum sp* leaves and ragi seed husk, 6.0 pH and 50 min contact time had given the end values of 0.43 mg/l of fluoride. The optimized values of RSM with respect to the end fluoride content (0.43 mg/l) after treatment process were validated using feed forward model of Artificial Neural Network (ANN). ANN predicted value (0.4250 mg/l) was very close to the optimized experimental value of RSM design (0.43 mg/l) and the error was 0.049. In conclusion, an optimized process was developed for the removal of fluoride from the drinking water using *Ocimum sp* leaves and Ragi seed husk as natural fluoride adsorbents. Final concentration of 0.43 mg/l of fluoride was achieved.

CLAIM(S) OF THE INVENTION:
- Design and optimization of an economically viable, eco-friendly and easy method for defluoridation of drinking water using immobilized *Ocimum sp* leaves along with ragi seed husk beads as natural biosorbent agents.
- Optimization of the fluoride removal process applying RSM and ANN methodologies.

Keywords: Fluoride removal, Adsorption, *Ocimum sp* leaves and Ragi seed husk, Response Surface Methodology (RSM), Artificial Neural Network (ANN), EDAX analysis.

TITLE OF THE INVENTION: "Preparation of blended low alcoholic beverages from under-utilized millets with zero waste processing methods".

INVENTORS: R.S. Upendra[1*] and Pratima Khandelwal[2] U. Kavana[3], S. Sahithya[3] and Sateesh[3]
[1*]Sr. Asst. Professor, [2]Professor & Head, Department of Biotechnology, [3]BE (Biotechnology), Graduates (2008-2010)

PATENT HOLDER'S ADDRESS:
New Horizon College of Engineering (Autonomous), Bangalore 560 103, Karnataka, India

ABSTRACT OF THE INVENTION:

This invention deals with development of new table beverages using the underutilized regional millets-finger millet (ragi) and pearl millet (bajra) and blending them with selected fruits to develop low alcoholic beverages with appreciable acceptability. Different blends of fruit juices (green grapes, black grapes and apple) with finger millet and pearl millet along with germinated wheat kernels as inducers were taken and fermentation was carried for a desired period using period of 8-10 days using brewer's yeast (*Saccharomyces cerevisiae*). The dead biomass of yeast was specially handled using zero-waste generation process.

MAIN NOVEL FUTURES OF THE INVENTION:
- Utilization of underutilized millets and blending them with selected fruits to develop low alcoholic beverages with appreciable acceptability.
- Different blends of fruit juices (green grapes, black grapes and apple) with finger millet and pearl millet along with germinated wheat kernels
- Development of zero-waste generation process for handling fermentation waste

NON THERMAL MICROBIAL CONTROL MECHANISM
A REVOLUTION IN STERILIZATION TECHNOLOGY

Dr.Ananda Vardhan Hebbani, Roopasri Ranganatha and Dr. John Barnabas

Department of Biotechnology, New Horizon College of Engineering, Bangalore

Sterilization refers to the total destruction of micro-organisms which is of prime importance, preventing the contamination of various food and pharmaceutical products and thus enabling an increase in the products' shelf life. Microbial control is established through the use of various physical agents such as heat and radiation, various chemical agents and a number of antimicrobial substances from diverse biological sources.

Among the physical methods of sterilization, both ionizing and non ionizing radiations are used in the food industry to ensure microbial control. In particular, UV radiations and microwaves have found a number of applications in the food industry. Microwaves are mainly radio waves with wavelengths ranging from 1 mtr to 1 mm or having a frequency range between 300 MHz to 300GHz.The destruction of micro-organism by using radiation has been mostly understood in terms of the heat generated by the microwaves on the substrate, hence indirectly causing destruction to bacterial cells (Fung and Cunningham1980; Vela and Wu 1979). Various microorganisms are reported to be sensitive to microwave radiation including *Escherichia coli, Streptococcus faecalis, Clostridium perfringens, Staphylococcus aureus, Salmonella and Listeria sp* (Atmaca *et al.,* 1996; Blanco and Dawson, 1974; Bookwalter *et al.*, 1982; Crespo 1977; Culkin and Fung, 1975; Farber *et al.*,1998; Fujikawa *et al.* , 1992; Heddleson, 1994; *et al.,* Ishitani *et al.*,1981; Khalil and Villota, 1989; Pothakamury,1995). In addition it has been reported that microwaves are also effective against fungal spores, bacteriophage PL-1, specific to *Lactobacillus casei* (Ishitaniet *et al.*, 1981; Kakatiya, 1985; Khalil and Villota 1989). Thus, it has been widely believed that bacterial cells are destroyed due to heat caused by microwave exposure. **However recent studies suggest that other parameters excluding heat contributed to the lethal effect of microwaves** (Yagmaee and Durance, 2005). **Low doses of microwaves have been effective in improving the microbial quality of ice-creams** (Jo *et al.*, 2007). Various investigations have been carried out in order to validate if microwaves have a non-thermal effect on micro-organisms (Carroll and Lopez, 1969; Culkin and Fung, 1975; Kozempel 1998; Shin and Pyun, 1997). It has been established that micro-organisms can be destroyed at temperatures lower than thermal destruction point (Cunningham 1978, Dreyfuss and Chipley, 1980; Khalil and Villota, 1989; Kozempel *et al.*, 1998). Exposure to microwave also was found to result in an irreversible and time dependent inactivation of various enzymes (due to various structural arrangements in the proteins) which are not related to temperature (Marina Porcelli *et al.*, 1997).

Since our preliminary investigations have proven the microbicidal activity of microwave even at very low doses (Barnabas & Ananda 2013); a microwave source ergonomically designed with options of easy operation is thus proposed which would be a useful gadget expected to revolutionize the field of sterilization technology with enormous applications either in food industry or health care sector.

World's First and Largest 3D Screen (16'6") Video Simulator Ride having 20 Seats Built on 35' Truck Chassis with Expandable Auditorium *On* Wheels
India's First Simulator Ride *ON WHEELS* Built on Multi-purpose Expandable Auditorium

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Introduction to "Expandable Auditorium On Wheels with 7DPlus Simulator"

Normally the 4D/5D/6D Theaters or 3D Simulator Rides/Video Rides are the best examples to showcase/promote the interplay of various Science & Technology to create Virtual Reality/Immersive Experience and make the audience to understand complex theories, basics and principles with the help of stereoscopic 3D images (also called "intelligent imaging system") along with simulation of seat movements in virtual environment and also to educate them in an interesting way with their proactive involvement. It is a *New Age Edufotainment (Education, Information & Entertainment)* initiative and contemporary way of cultivating interest for learning science & technology among school kids in a lucid way. These kinds of theatres are available at Disneyland (Parris, Hong Kong, Los Angeles etc), Sentosa Island (Singapore), Various World-class Science Centres/Museums/Exploriums, few Amusement Parks and Malls in India. The **7DPlus Video Simulator Rides (Theatres) or Stereoscopic 3D or 7D+ Simulator Rides** integrated by us, which can be installed either on Permanent/semi-Permanent Model or On Wheels at Science Centres/Museums, Schools/Academic Institutions/ Professional Institutions or *"On Wheels"* has been the superior integrated system than all these experiences in India and Abroad and also designed/integrated by us in such way to provide better experience, feeling, sense of satisfaction and higher value for money to every stake holder. It is ideal solutions for various cities including Tier II or Tier III cities where Science Centres/Museums are yet to come, and provide cost effective solutions.

The 7D Attraction typically is situated in a mall or a theme park in a fully enclosed location measuring at least 600 to 1200 sq ft for 16-24 Seats. The site will house the auditorium, the control room and pre-show waiting area for visitors. The complete 7D Attraction system consists of (i) Motion seats and Special Effects (SFX), (ii) Projection or Video equipment, (iii) Audio equipment, (iv) Motion controllers and drivers, (v) Hardware/Software to co-ordinate the synchronizations. The entire visual pleasure is built on **"Stereoscopic 3D Technology" or S3D.** The same system has been integrated in such a way at lowest possible cost because of its innovative state of the art technological superiority "On Wheels" which has been patented (International Patent Filed at Russian Federation-ROSPATENT) by us. National Design and Research Foundation, The Institution of Engineers (India) (IEI) is constantly encouraging such inter-disciplinary researches and supporting the International Patent filing process. New Horizon College of Engineering, Bangalore is the Institutional Member of IEI and has signed MoU with National Design and Research Foundation for collaborative research projects on interdisciplinary and multi-disciplinary areas.

The technique of creating or enhancing or enriching the illusion of depth in an image or a video footage by presenting two offset images or video footages separately to the left and right eye of the viewer is called **"stereoscopy"** (also called stereoscopic vision or 3D imaging or stereo 3D or S3D). The set of these 2D (*x & y axis*) offset images/visuals are then combined or processed in the brain instantly to give the perception of 3D depth or *z axis*. This can be accomplished in the following three ways:

1. The viewers wear eyeglasses to combine separate images from two offset sources
2. The viewers wear eyeglasses to filter offset images from a single source separated to each eye
3. The light source split the images directionally into the viewer's eyes (no glasses required to view which is also known as Auto stereoscopy)

Concept:

To showcase/promote the interplay of various Science & Technology (also to understand the need for inter-disciplinary or multi-disciplinary approach) to create Virtual Reality/Immersive Experience and inculcate the interest for Science, we wish to establish Network of *4D* or *5D* or *7DPlus* Theatres/Fun Corners at Science Centres, Museums, Schools/Tourist Places/Academic Institutions and/or ***On Wheels*** either with the support of Government or Public-Private Partnerships or Sponsorship from Corporate world as CSR initiative*. Within 3 Years, we can explore the opportunities by establishing at least 15-25 such facilities across the country to benefit the School Children either on Permanent/semi-Permanent or On Wheels at Science Centres, Museums, Schools/Tourist Places/Academic Institutions etc.

Major Components of a 7DPlus Video Simulator Rides (Theatres) or Stereoscopic 3D or 7D+ Simulator Rides

The 7D Attraction brings together an immersive real life experience on-screen and sensational seat simulation coupled with special effects that are bound to enthrall our visitors. Historically, 7D Attractions have been thought of as a fringe benefit added to numerous other entertainment options in a Science Centres/Museums or mall or a theme park, but this idea is rapidly changing and making way for a truly world class learning centre or edufotainment experience to educate science/technology to contemporary school kids in a lucid way.

The technology that goes into the making of a 7D Attraction is truly world class as it combines the best in the business of audio-visual equipment including extreme performance control systems and high-end simulation. The 7D Attraction adds a layer of immersive fun for our visitors by treating them to experience the world of not only audio-visual but also other sensory effects such as Touch (Ticklers), Smell (Aroma), Movement of Seats, Combination of Rain, Wind, Snow, Bubble, and Lightening Effects. All the seat effects and theater effects are built-on either Permanent/semi-Permanent Model or as Mobile Auditorium/Theater on Wheels.

7DPlus Video Simulator Rides (Theatres) or Stereoscopic 3D or 7D+ Simulator Rides ON WHEELS

7DPlus Technology Network Company is aiming to provide NewAge Edufotainment (Education, Information & Entertainment) Solutions. It has designed indigenous 7XDPlus Video Simulator Ride Auditorium/Theater into a traveling road show or in other words **7D+ Theater** *On Wheels* or on the move wherever required, it can be parked and provide amusements, education and entertainment to the viewers. These mobile attractions are completely turnkey and ideal for temporary or semi-permanent (quasi-permanent) exhibits at science centres, museums, zoos, fairs, carnivals, religious festivals, Special parties, Celebrations, special events etc and a host of other venues. Each 7XDPlus On Wheels attraction can be customized for every event with branding and theming inside and out — as well as custom 3D contents. Our standard 3DoF/6 DOF Pneumatic/Hydraulic/servo motion EFX seats are a perfect fit for this advancing technology.

The following pictures are self explanatory to provide the features of **7DPlus Simulator ON WHEELS** built by us as a prototype and proof of concept (PoC) to demonstrate the capability of interdisciplinary research out come and built its kind first time in India with the help of Hi-Tech Engineers, Bangalore which has their Design Studio and Product Development Centre at New Horizon College of Engineering. It is built on Ashok Leyland Multi-Axle Chassis. Hi-Tech Engineers are specialized in Special Purpose Vehicles (SPV) such as 1000 KVA Genset with Sound Proof On Wheels, Outside Broadcasting (OB) Vans, Hospital On Wheels (Mobile Dental Clinics), Kitchen On Wheels (Restaurant On Wheels) etc. They have also built Cluster of Bio-Toilets On Wheels for First International Air Show

held at Bangalore. They regularly do projects related to design and development of SPVs for Indian Space Research Organisation (ISRO), Gas Turbine Research Establishment (GTRE), Defence Research and Development Organisation (DRDO), Aeronautical Research and Development Board (AR&DB), Bharat Earth Movers Ltd (BEML), National Aerospace Laboratories (NAL) and Hindustan Aeronautics Ltd (HAL) etc. They always strive for innovative and cost effective contemporary solutions for their projects. Recently, they have developed dental clinic kit for door to door service as "D2H" for M/s Mobident as "World Class Dental Care: Affordable & Accessible at your Door step".

7DPlus Simulator ON WHEELS, houses World's First and Largest 3D Screen (16'6") Video Simulator Ride having 20 Seats Built on 35' Truck Chassis with Expandable Auditorium On Wheels. *9 International Patents have been filled at Russian Federation under Utility Model Application No.2014115371*.

It is a self contained Air-Conditioned Auditorium has very good state of the art acoustics insulation with In-built Generator with On-line UPS etc. It has also fitted with Snow Machines, Bubble Machines along with all other Special Effects as mentioned above. The entire indigenous design process of **7DPlus Simulator ON WHEELS** with the help of National Design and Research Forum, The Institution of Engineers (India) and Dr.Saurabh Kwatra, Head, International Innovations, New Delhi has resulted in nearly 12 more International Patents which has been filled recently.

Various Potential Applications of Expandable Auditorium On Wheels:

The proposed Multi-purpose Expandable Auditorium can be used for variety of other applications and can house Intensive Care Unit (ICU), Rural Hospital, Computer/Internet Centre, Mobile Labs, Mobile Digital Library, Live Telecast Sound Proof Studio, Dormitory, Caravan, Mobile Home etc. For Further Details regarding the commercialization of the product can be heard from Managing Partner, 7DPlus Technology Network Company *[New Age Edufotainment (Education, Information & Entertainment) Solutions Company]*, having its Registered Office at Sakthi Body Works Campus, 46, Poonamallee Bye-Pass Road, (Opp to MTC Bus Depot.), Poonamallee, Chennai 600 056, Tamil Nadu, Mobile: 09566776675 Email: tmssri@yahoo.co.in. Currently the Mobile Auditorium On Wheels is in commercial operation at Sripuram Golden Temple, Near Vellore, Tamil Nadu, since June 2013 onwards.

Prototype of 7DPlus Video Simulator Ride *"On Wheels"*
9 International Patents have been filled at Russian Federation under Utility Model Application No.2014115371
Russian Federation (Rospatent) International Patent No. 152801

7DPlus Video Simulator Ride *"On Wheels": Screen Portion after Expansion*
9 International Patents have been filled at Russian Federation under Utility Model Application No.2014115371
Russian Federation (Rospatent) International Patent No. 152801

Conceptual Model of 7DPlus Video Simulator Ride *"On Wheels": Inside View of the Auditorium after Expansion*
9 International Patents have been filled at Russian Federation under Utility Model Application No.2014115371
Russian Federation (Rospatent) International Patent No. 152801

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Methodology/Construction of the means which providing telescoping of elements of the transport vehicle
Expanding Mechanism/Sliding Mechanism

Conceptual Design:
I have designed a Truck/Bus built on a conventional truck chassis available at market which will be expanding either on both sides or on one side (plane) parallel to its side (lengthwise) based on our requirement and also will move the ceiling (roof-top) upward to provide more floor area in all directions (length x width x height) inside the Truck/Bus to accommodate the Large Size Projection Screen (16'x9' or more). This will provide 3 times or more than the original floor area of the Truck/Bus including the saloon area or even still more floor area and volume by having telescopic expansion of the sides on all three or four directions, i.e., left, right, upward and backward" based on our needs.

Expanding Mechanism/Sliding Mechanism:
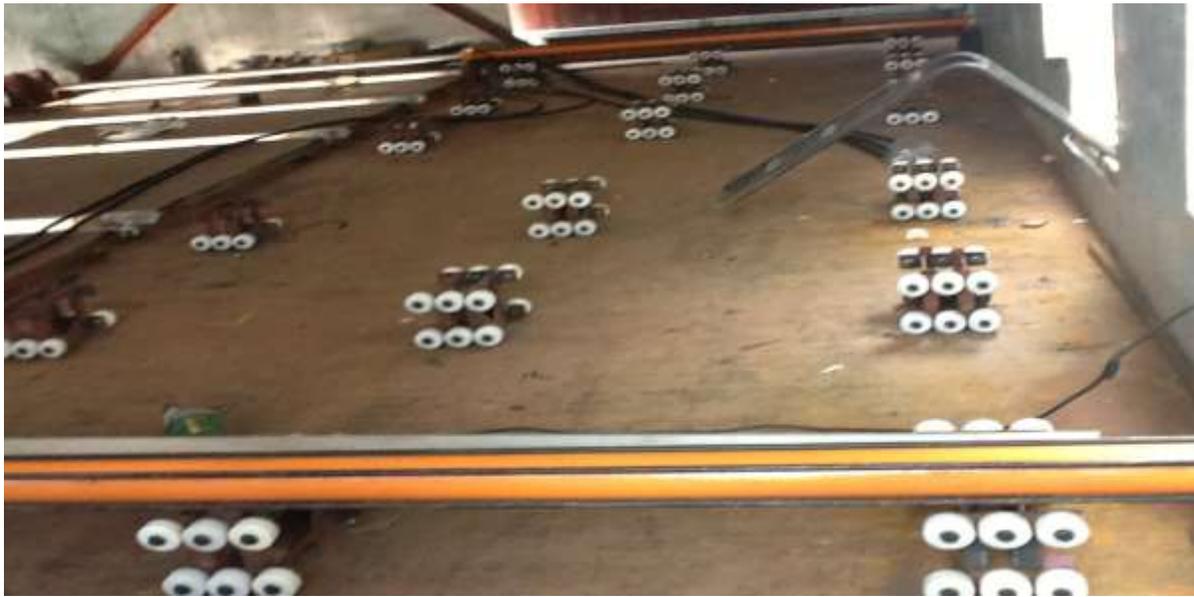
Figure 1 Hydraulic Cylinders along with array of Teflon Wheels

Figure 1a. Hydraulic Cylinders with Power Pack *(Left)* **and Piston Mounting to Push Expanding Portion along with array of Teflon Wheels up & down to hold the bottom platform intack during sliding in/out** *(Right)*

The first functional Prototype has been fabricated on 35' Standard Truck Chassis with an Expanding Area (25'x8') using 2 Hydraulic Cylinders as shown in above figure 1 & 1a in Signal Red Colour. These cylinders push the

Expandable Portion of the Mobile Auditorium towards the left (away from the main floor) and duly supported by five landing wheels which were assembled/attached to the outside body before the expansion at sprit level as shown in figure 2 & 2a. The entire expandable portion gently slides and gets guided on array of 244-272 numbers of Teflon Wheels having 50 mm diameter (allowing the stainless steel plate covered bottom floor) which ensures the 2000-2500 kg load of expandable portion smoothly with reduced friction. Fully Expanded Auditorium on Five landing wheels is shown in figure 3. Major Guiding Wheels (6 numbers on each side, total 12 wheels having 150 mm diameter) which are mounted at the inner end of "X" beam fixed on either sides which provide additional support to expanding portion also sliding between rigid stainless steel plate guides mounted at the major stationary portion of truck are partly seen at Top & Bottom in figure 3 & 3a.

**Figure 2 Five landing wheels which were assembled/attached
to the outside body of expandable portion before the expansion**

**Figure 2a Five landing wheels which were assembled/attached
to the outside body of expandable portion before the expansion is moving outward during expansion**

Figure 3 Fully Expanded Auditorium on Five landing wheels
(Major Guiding Wheels are partly seen at Top & Bottom)

Figure 3a Major Guiding Wheels are partly seen at Top & Bottom *(Left)* **and "X" Beams Fixed on eitherside** *(Right)*

The above "Expandable Multipurpose Auditorium" which could be used as regular Theater/4D-7D Theater/Seminar Hall/Class Room/Laboratory/Library etc. based on the needs/applications by overcoming the limitations imposed by Motor Vehicle Rules & regulations of various countries and will achieve "Portability, Expandability & Compactability in design" through Innovation and will result in many fold increase in floor area and/or volume inside the truck/bus while it is in stationary.

Please open the separately attached Video Files to see the actual movement of Expandable Portion of Auditorium for your reference.

Final Stage of Fabrication of Expandable Auditorium on Wheels built on Truck Chassis

Various Stages of Fabrication of Expandable Auditorium on Wheels built on Truck Chassis

Various Stages of Fabrication of Expandable Auditorium on Wheels built on Truck Chassis

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Various Stages of Fabrication of Expandable Auditorium on Wheels built on Truck Chassis

Final Stage of Fabrication of Expandable Auditorium on Wheels built on Truck Chassis

Conceptual Design of Expanding Upward and Both Sides of Truck to get More Spacious Auditorium

Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Fig 6

Brief Career Profile of Dr. K. GOPALAKRISHNAN, INDIA
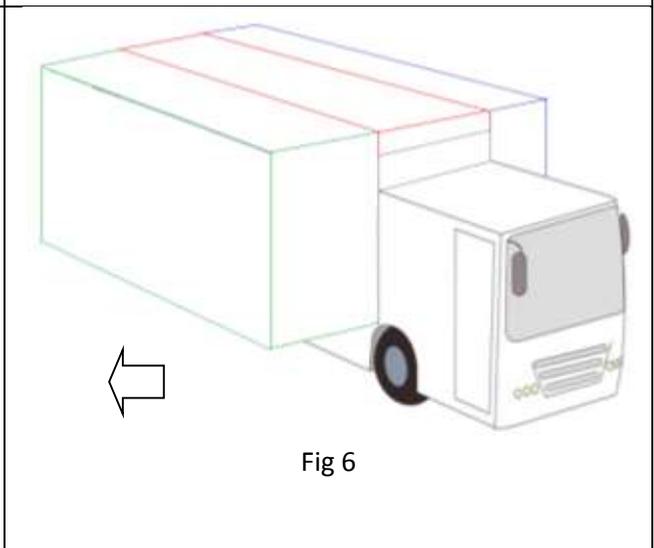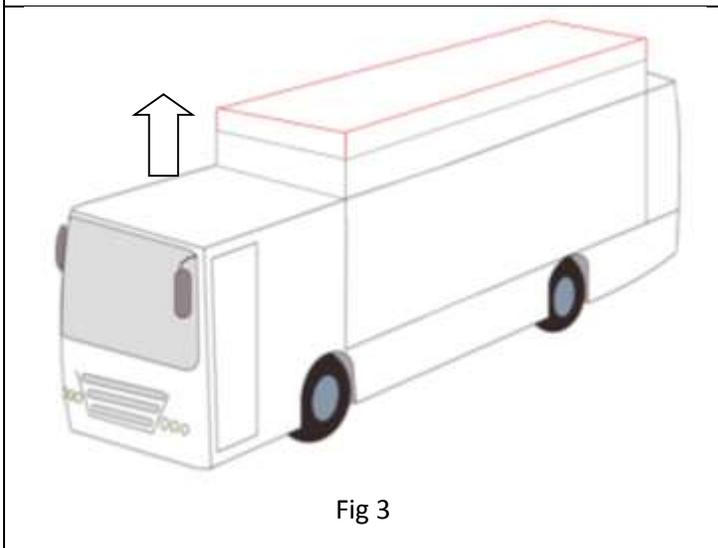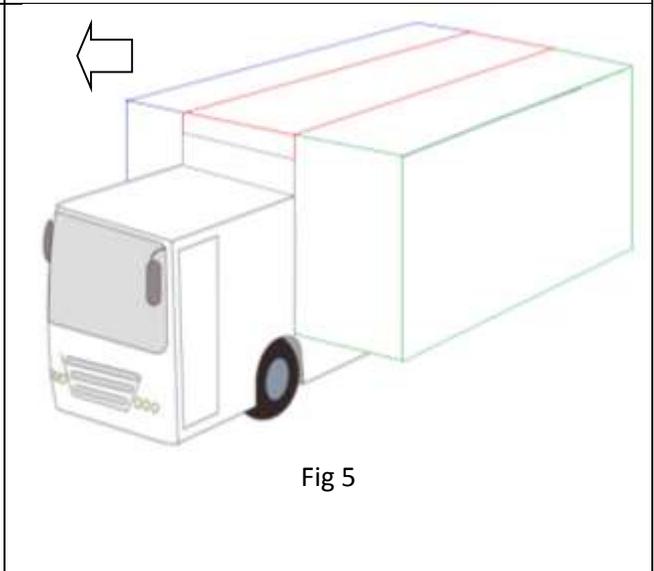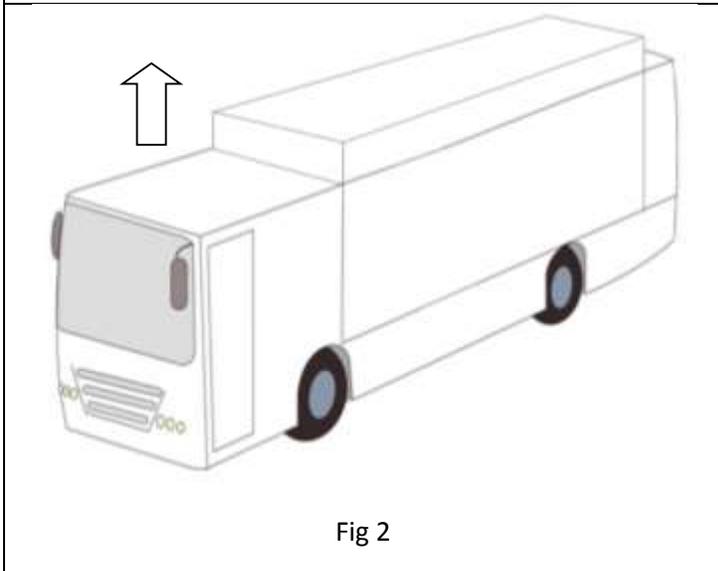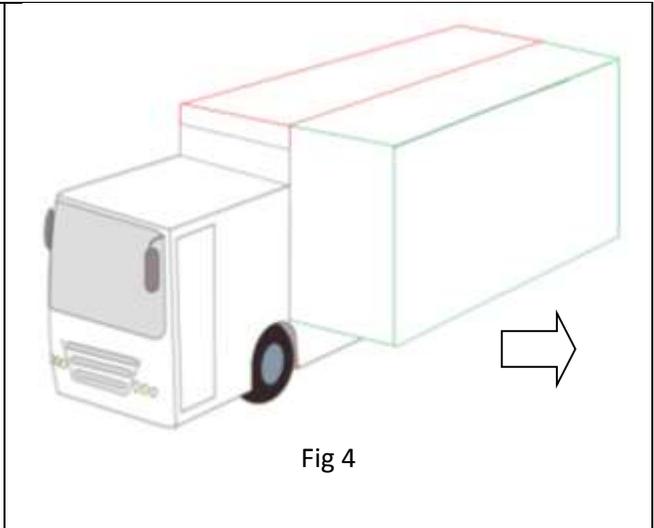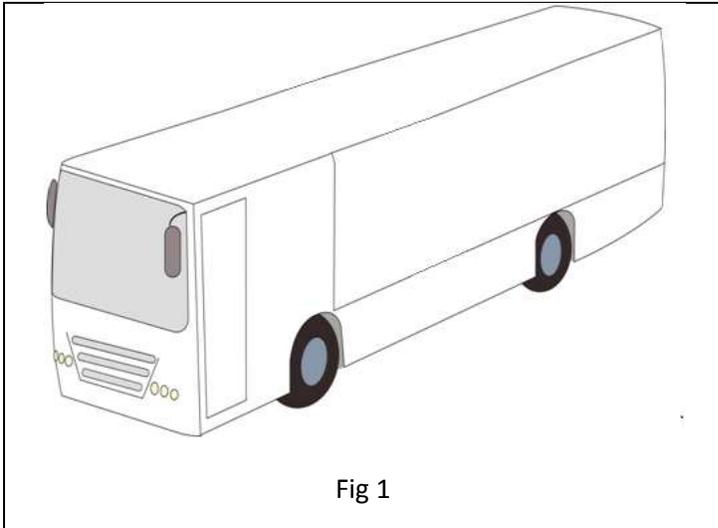
Dr. K. Gopalakrishnan, BE (Mechanical), ME (Industrial.), MBA, FIE, PhD, is the Charted Engineer and Member of Co-ordination Committee for Safety and Environment of Bureau of Indian Standards (BIS). He is a Fellow and National Council Member of The Institution of Engineers (India). He was the Chairman of The Institution of Engineers (India), Karnataka State Centre and Chairman of Marine Engineering Division Board of IEI. He received his Bachelor and Masters Degree in Industrial Engineering from Thiagarajar College of Engineering, Madurai and PhD from Anna University, Chennai, INDIA. He is the Founder Managing Partner of 7D+ Fun Corner (India's First 7D+ Video Simulator Ride got the ISO 9001:2008 Certification) and 7DPlus Technology Network Company. He was the Mentor and Chief Scientist at Global Institute of Stereo vision and Research, Chennai. He is also the Adviser of Paragon Info Systems UK Ltd, ENGLAND.

His current research interests and field of practice covers Design and Development of Expandable Auditorium On Wheels, Motion Simulators, Micro Air Vehicles (MICAVs), Intelligent Imaging System, Marine Corrosion & Bio-fouling, Ocean Observation System, Research Vessel Management, Marine Resources, Marine Safety & Environment and TQM.

He is having 26+ years of experience in Industry, Consultancy, Teaching, Training and Research. He published number of Research papers and won various Awards/Honors besides guided 7 Ph.D Scholars. He is the Secretary and Director General of Indian Institute of Safety and Environment.

As an Academician and Researcher, he had the opportunity to work closely with many Vice-Chancellors of Technical Universities including Anna University and Visvesvaraya Technical University, Ministry of Human Resource and Development, Government of India and contributed to the development of various Academic Research Process Models, teaching-learning process models, learning pedagogy and governance & management process models for Institutions for Higher Learning. He facilitated and played proactive roles for better Institute-Industry-Interaction and Sponsored/Funded Research initiatives in Universities/Engineering Colleges. He is instrumental for the introduction novel Academic Research Initiatives at Anna University, Coimbatore which resulted in the highest number of enrollment of PhD Research Scholars in India. His professional visits to many countries including China, Hong Kong, France, Germany, Switzerland, Singapore, Malaysia, Thailand and Sri Lanka resulted in better collaborations.

He was the Co-investigator of the proposal for National Research Initiative in Micro Air Vehicles (MICAVs) under the auspices of Defence Research & Development Organisation (DRDO) / Aeronautical Research & Development Board (AR&DB)/DST. The Hub centre will be located at National Aeronautics Laboratory (NAL), Bangalore and the Associate Centres will be at IIT-Kanpur, IIT-Bombay, IISc, Bangalore and NDRF (Consortium), Bangalore.

He is also a Fellow / Member of nearly 20 Professional Institutions / Societies. He is regularly publishing research / technical papers in International / National Journals & Conferences. He was the Organising Secretary of International Conference series "TEAM TECH 2004, 2006, 2007 & 2008" conducted at J.N. Tata Auditorium, Indian Institute of Science (IISc), Bangalore. He was also an Editor of the proceedings of these conferences.

He was the member of Board of Research, Anna University Coimbatore, and also the Academic Council & the Board of Studies on Research of Dr. MGR University, Chennai. He was nominated as a Member, Board of Governors & National Working Group Member of National Design & Research Forum (NDRF) of the Institution of Engineers (India) - IE(I). He is the Editor-in-Chief of "Engineering Design" – A Quarterly Journal published by NDRF and Editor-in-Chief of "Manufacturing Technology and Management" – A Quarterly Journal of Indian Institution of Production Engineers (IIPE).

He is also the Publisher of "World Safety and Environment" – A Quarterly Journal of IISE.

He is a Life Fellow Member of Indian Institution of Production Engineers (IIPE), Rapid Prototyping Society of India (RPSI), Engineering Design & Analysis Forum (EDAF), Biosensor Society of India (BSI), National Institution for Quality & Reliability (NIQR) etc. He served as Sponsored Research Coordinator of Anna University, Coimbatore. Presently he is serving as the Dean (R&D), New Horizon College of Engineering, Bangalore.

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World's First and Largest 3D Screen (16'6") Video Simulator Ride having 20 Seats Built on 35' Truck Chassis with Expandable Auditorium On Wheels
India's First Simulator Ride *ON WHEELS* Built on Multi-purpose Expandable Auditorium Designed and Developed by Dr. K. GOPALAKRISHNAN
Russian Federation (Rospatent) International Patent No. 152801

NDRF-IEI IPR Cell: The First International Patent from Russian Federation (Rospatent) has been presented to Dr. K. Gopalakrishnan, Chairman, R&D Committee and Dr. K. Ramachandra, Director, NDRF for the "World's First Expandable Mobile Auditorium On Wheels with 7D Simulator Built on 35' Chassis having Largest 3D Screen (16') and 20 Seats",

An official delegation including **The Institution of Engineers (India)** President has accompanied the Hon'ble President of India **Shri Pranab Mukherjee** during the state visit to Russia, from 07 - 11 May 2015 attended the 70th Victory Day Celebrations at Moscow to mark the **70th Anniversary of the Victory in Great Patriotic War (World War II)**

IEI Delegation with Indian Foreign Secretary, Mr. S. Jaishankar and MHRD Secretary (Higher Education), Mr. Satyanarayan Mohanty

L to R: Dr. K. Gopalakrishnan, Chairman, R&D-IEI, Mr. S. S. Rathore, Past President, IEI, Mr. S. Jaishankar, Mr. Satyanarayan Mohanty, Dr. L. V. Muralikrishna Reddy, President, IEI, Mr. A. Basa, Immediate Past President, IEI

Academic Delegation Visited Russia with Hon'ble President of India **Shri. Pranab Mukherjee**

L to R Sitting: **Shri. Manoj Sinha,** Minister of State, Railways, Hon'ble President of India **Shri. Pranab Mukherjee** and **Shri. P. S. Raghavan,** Ambassador of India to the Russian Federation

L to R Standing: Prof. Bimal K. Roy, Director, Indian Statistical Institute, Dr. K. Gopalakrishnan, Chairman, R&D-IEI, Mr. A. Basa, Immediate Past President, IEI, Mr. S. S. Rathore, Past President, IEI, Prof. R. K. Shevgaonkar, Director, IIT Delhi, Dr. L. V. Muralikrishna Reddy, President, IEI, Mr. Satyanarayan Mohanty, MHRD Secretary, Prof. Dinesh Singh, Vice Chancellor, University of Delhi, Dr. Jayant B. Udgaonkar, National Centre for Biological Sciences, Prof. Devang Khakhar, Director, IIT Bombay and Prof. Bhaskar Ramamurthi, Director, IIT Madras *(not seen)*

*Indo-Russian Academic Delegation led by Hon'ble President of India **Shri Pranab Kumar Mukherjee** during the state visit to Russia, from 07 - 11 May 2015 attended the 70ᵗʰ Victory Day Celebrations at Moscow to mark the 70ᵗʰ Anniversary of the Victory in Second World War.*

Indian Side:
IIT Bombay, IIT Madras, IIT Delhi, University of Delhi, the Institution of Engineers (India), the Indian Statistical Institute. So, we have three IITs, we have Delhi University, Institution of Engineers, and the Indian Statistical Institute.
Russian Side:
Tomsk State University, the Ural Federal University, the Tomsk Polytechnic University, the Skolkova Institute of Science and Technology, the Higher School of Economics of Moscow, the Lomonosov Moscow State University, and the Russian Union of Scientific and Engineering Associations.

Experience the seventh dimension on wheels

A team of five worked on the project for six months and came up with a bus that could be converted into a 20-seater auditorium

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It may look like any other bus on the road, but it's far more than that. In fact, it's an auditorium on the wheels. The National Design and Research Forum has received an international patent from Russia (Russian Federation-ROSPATENT) for its latest invention called the 'Multipurpose Expandable Auditorium on Wheels'.

A team of five worked on the project for six months and came up with a bus that could be converted into a 20-seater auditorium.

K G Gopalkrishnan, the lead member of the team felt the need to take technology to rural areas. Gopalkrishnan, chairman, research and development cell, Institution of Engineers, said; "The idea occurred to me when I was watching a movie in a cinema. It was a 3D film and I wondered why only people in cities should be able to watch these films; why not in villages too. I also realised that building a whole cinema in every village was not possible. That's when I though if rural folk can't reach technology, let's take technology to them."

The expandable theatre is built on 35-foot truck chassis with an expandable 16-foot screen. The chassis also has 20 seats. This seats and the screen is what has helped the team to bag the patent.

Murali Krishnan Reddy, All-India president of the Institute of Engineers and a team member, said, "There have been moving auditoriums before, however, they were all built on 80-ft chasses, with a much smaller screen. The maximum number of seats that could be accommodated was 12. Ours is different. The expandable unit is where the screen is located and this helps to create the correct distance between seats and screen."

The '7DPlus Simulator On Wheels' prototype and proof of concept (PoC) is built on an Ashok Leyland Multi-Axle chassis. The manufacturing of all components has been done in Bengaluru itself. The bus was made by Hi-Tech Engineers at C V Raman Nagar and most of the components used were bought in Peenaya.

Taking the whole experience of entertainment a step further, the wheeled auditorium has a 3D screen along with a 7D simulator. This makes it a complete 7DPlus Video Simulator ride. It is also fitted with snow machines, bubble machines along with all other special effects. These features actually help experience a movie rather than just watch it.

K Ramachandra, director, National Design and Research Forum, said, "When you see a movie in this theatre you will feel all the effects too. If it is snowing in the movie the snow machine while create snow in the theatre as well, if a car turns left your seats will also tilt. This is a similar experience you would get in an amusement park."

While currently built as a theatre, it can also be converted into various other facilities like an Intensive Care Unit (ICU), rural hospital, computer/Internet centre, etc.

Gopalkrishnan added, "The prototype was built at a cost of Rs 1.2 crore which is low as most of the products were manufactured locally. We can now further reduce the cost to Rs 60-70 lakh as we plan to sell it commercially. Within three years, we want at least 15 to 25 such facilities to be used across the country."

ವಿಟಿಯು ಕುಲಪತಿ ಡಾ.ಎಚ್.ಮಹೇಶಪ್ಪ ಅಭಿಮತ

ಡಿಜಿಟಲ್ ಇಂಡಿಯಾದಿಂದ ಉತ್ಪಾದನಾ ಕ್ಷೇತ್ರಕ್ಕೆ ಉತ್ತೇಜನ

ಬೆಂಗಳೂರು: ದೇಶದ ಹಳ್ಳಿ-ನಗರ ಪ್ರದೇಶಗಳು ಡಿಜಿಟಲ್ ಇಂಡಿಯಾ ಮೂಲಕ ತಂತ್ರಜ್ಞಾನ ಸ್ನೇಹಿಯಾಗಲಿವೆ ಎಂದು ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿವಿ ಕುಲಪತಿ ಡಾ.ಎಚ್. ಮಹೇಶಪ್ಪ ಅಭಿಪ್ರಾಯಪಟ್ಟರು.

ಇನ್ಸ್ಟಿಟ್ಯೂಟ್ ಆಫ್ ಇಂಜಿನಿಯರ್ಸ್ ಇಂಡಿಯನ್ ಟೆಕ್ನಾಲಜಿ ಕಾಂಗ್ರೆಸ್ ಸೇರಿದಂತೆ ವಿವಿಧ ಸಂಸ್ಥೆಗಳ ಸಹಯೋಗದಲ್ಲಿ ನಿಮ್ಹಾನ್ಸ್ ಸಭಾಂಗಣದಲ್ಲಿ ಎರಡು ದಿನ ಹಮ್ಮಿಕೊಂಡಿರುವ 3ನೇ ಭಾರತೀಯ ತಂತ್ರಜ್ಞಾನ ಸಮಾವೇಶದ ಉದ್ಘಾಟನಾ ಕಾರ್ಯಕ್ರಮದಲ್ಲಿ ಅವರು ಮಾತನಾಡಿದರು.

ಪ್ರಧಾನಿ ನರೇಂದ್ರ ಮೋದಿ ಅವರ ಮೇಕ್ ಇನ್ ಇಂಡಿಯಾಹಾಗೂಡಿಜಿಟಲ್ ಇಂಡಿಯಾಯೋಜನೆಗಳಿಂದ ಉತ್ಪಾದನಾ ಕ್ಷೇತ್ರಕ್ಕೆ ಸಾಕಷ್ಟು ಉತ್ತೇಜನ ದೊಗುಕುತ್ತಿದೆ. ಈ ಯೋಜನೆಗಳು ಜಾಗತಿಕ ಹೂಡಿಕೆಗೆ ಭಾರತೀಯ ಉದ್ಯಮಗಳನ್ನು ಆಕರ್ಷಿಸುತ್ತವೆ. ಡಿಜಿಟಲ್ ಇಂಡಿಯಾ ರಾಷ್ಟ್ರದಲ್ಲಿರುವ ಎಲ್ಲಾ ಹಳ್ಳಿ, ನಗರ ಪ್ರದೇಶಗಳನ್ನು ತಂತ್ರ ಜ್ಞಾನಸ್ನೇಹಿಯಾಗುವಂತೆ ಮಾಡುತ್ತದೆ. ಆದರೆ, ಇವುಗಳ ಪ್ರಯೋಜನ ದೊರೆಯಲು ಸಂಶೋಧನ ಮಟ್ಟ ಹಾಗೂ ಕೌಶಲ್ಯ ಅಭಿವೃದ್ಧಿಗೊಳ್ಳಬೇಕು. ಆಯಾ ಕ್ಷೇತ್ರಗಳಲ್ಲಿ ಅನುಭವವಿರುವವರ ಮೂಲಕ ತಂತ್ರಜ್ಞಾನ ರೂಪಿಸಿದರೆ ಅದರಿಂದ ಹೆಚ್ಚಿನ ಪರಿಣಾಮ ದೊರಕಲಿದೆ ಎಂದರು.

ಇನ್ಸ್ಟಿಟ್ಯೂಟ್ ಆಫ್ ಇಂಜಿನಿಯರ್ಸ್ ಸಂಸ್ಥೆಯ ಅಧ್ಯಕ್ಷ ಡಾ.ಎಲ್.ವಿ. ಮುರಳೀಕೃಷ್ಣಾರೆಡ್ಡಿ ಮಾತನಾಡಿ, ಭಾರತದಲ್ಲಿ ಸಂಶೋಧನೆಗೆಕಾರಿಗಳಿಗೆ ಹೆಚ್ಚುಉತ್ತೇಜನನೀಡಬೇಕು. ವಿದ್ಯಾರ್ಥಿ ಮತ್ತು ಉದ್ಯಮಿಗಳನ್ನು ಪ್ರೋತ್ಸಾಹಿಸುವ ದಿಸೆಯಲ್ಲಿ ಕಾರ್ಯಕ್ರಮಗಳು ಆಗಬೇಕು. ಸೂಕ್ಷ್ಮ, ಸಣ್ಣ ಹಾಗೂ ಮಧ್ಯಮ ಕೈಗಾರಿಕೆಗಳು ಉತ್ತೇಜನ ನೀಡಬೇಕು. ತಂತ್ರಜ್ಞಾನ ಕ್ಷೇತ್ರದಲ್ಲಿ ಭಾರತ ಸಾಕಷ್ಟು ಸಾಧಿಸಿದೆ. ಆದರೆ

ಜಾಗತಿಕ ಮಟ್ಟದಲ್ಲಿ ಈ ಸಾಧನೆಯನ್ನು ಗುರುತಿಸುವ ಅವಶ್ಯಕತೆಯಿದೆ ಎಂದು ಅಭಿಪ್ರಾಯಪಟ್ಟರು.

ಇಂಜಿನಿಯರಿಂಗ್ ಸಂಸ್ಥೆಗಳ ವಿಶ್ವ ಒಕ್ಕೂಟದ ಪ್ರೆಸಿಡೆಂಟ್ ಎಲ್ಕ್ಟ್ ಜಾರ್ಜ್ ಸ್ಟಿವಾಲ್ಟ್ ಮಾತನಾಡಿ, ಸ್ಥಳೀಯ ಸಂಸ್ಕೃತಿಗೆ ಹೆಚ್ಚು ಒತ್ತು ನೀಡಿ, ಸಾಂಸ್ಕೃತಿಕ ಮೌಲ್ಯಗಳನ್ನು ಆಧಾರವಾಗಿಟ್ಟುಕೊಂಡು ಸಂಶೋಧನ ನಡೆದರೆ ಒಳ್ಳೆಯದು. ಜ್ಞಾನ, ಬುದ್ಧಿಶಕ್ತಿ ಹೆಚ್ಚಿಸಿಕೊಳ್ಳುವುದರತ್ತ ಜನರ ಆಸಕ್ತಿ ಈ ಹಿಂದಿಗಿಂತ ಹೆಚ್ಚಾಗಿದೆ. ಉದ್ಯಮಶೀಲ ವಾತಾವರಣ ಹಾಗೂ ಸಾಮರ್ಥ್ಯವೃದ್ಧಿಸುವ ಮೂಲಕ

ಉದ್ಯಮ ಕ್ಷೇತ್ರದ ಬೆಳವಣಿಗೆ ಸಾಧ್ಯ ಎಂದರು.

ತಂತ್ರಜ್ಞಾನ ಕ್ಷೇತ್ರದಲ್ಲಿ ಸಾಧನೆ ಮಾಡಿದವರನ್ನು ಗೌರವಿಸಲಾಯಿತು. ಇನ್ಸ್ಟಿಟ್ಯೂಟ್ ಆಫ್ ಇಂಜಿನಿಯರ್ಸ್ ಹಿರಿಯ ಸದಸ್ಯರ ಸಂಸ್ಥೆಯ ವೆಬ್ಸೈಟ್ ಡಿಡಿಜಿಟಲ್ ಜಬ್ಟ್ಜಿಜೆ.ಟೆಜಯನ್ನು ಲೋಕಾರ್ಪಣೆ ಮಾಡಲಾಯಿತು.

ಕಾರ್ಯಕ್ರಮದಲ್ಲಿ ಸಮಾವೇಶದ ಸಂಘಟನಾ ಸಮಿತಿ ಅಧ್ಯಕ್ಷ ಪದ್ಮಶ್ರೀ ಪ್ರೂ. ಆರ್.ಎಂ. ವಾಸಗಂ, ಭಾರತೀಯ ಉತ್ಪಾದನ ಇಂಜಿಯರ್‌ಗಳ ಸಂಸ್ಥೆಯ ಅಧ್ಯಕ್ಷ ಡಾ. ವುಡೇ ಪಿ. ಕೃಷ್ಣ ಮತ್ತಿತರು ಉಪಸ್ಥಿತರಿದ್ದರು.

ಉತ್ಪಾದನಾ ಕ್ಷೇತ್ರಕ್ಕೆ ಕೇಂದ್ರ ಯೋಜನೆ ಉತ್ತೇಜನ

ತಂತ್ರಜ್ಞಾನ ಕ್ಷೇತ್ರದಲ್ಲಿ ಸಾಧನೆಗೈದ ಗಣ್ಯರನ್ನು ಸನ್ಮಾನಿಸಿದ ಡಾ.ಎಚ್.ಮಹೇಶಪ್ಪ, ಆರ್.ಎಂ.ವಾಸಗಂ, ಡಾ.ವುಡೇ ಪಿ.ಕೃಷ್ಣ, ಡಾ.ಬಿ.ವಿ.ರಾವ್, ಡಾ.ಕೆ.ಗೋಪಾಲಕೃಷ್ಣ ಮತ್ತಿತರು.

► இந்திய பொறியாளர் சங்கத்தின் பெங்களூரு கிளை சார்பில் நிமான்ஸ் அரங்கில் இந்திய தொழில்நுட்ப மாநாடு– 2015 என்ற பெயரில் சர்வதேச பொறியாளர் மற்றும் தொழில் வளர்ச்சி குறித்த கருத்தரங்கம் நடைபெற்றது. இதில் சிறந்த தொழிலதிபர் களுக்கு கூட்டமைப்பின் தேசிய தலைவர் பி.கிருஷ்ணா விருது வழங்கினார்.

World's First and Largest 3D Screen (16'6") Video Simulator Ride having 20 Seats Built on 35' Truck Chassis with Expandable Auditorium On Wheels
India's First Simulator Ride *ON WHEELS* Built on Multi-purpose Expandable Auditorium
Designed and Developed by Dr. K. GOPALAKRISHNAN
Russian Federation (Rospatent) International Patent No. 152801

NDRF-IEI IPR Cell: The First International Patent from Russian Federation (Rospatent) has been presented to Dr. K. Gopalakrishnan, Chairman, R&D Committee and Dr. K. Ramachandra, Director, NDRF for the "World's First Expandable Mobile Auditorium On Wheels with 7D Simulator Built on 35' Chassis having Largest 3D Screen (16') and 20 Seats",

ಹೈಟೆಕ್ ಬಸ್‌ನಲ್ಲಿ 7ಡಿ ಆಡಿಟೋರಿಯಂ

■ ಬೆಂಗಳೂರು ಸಂಸ್ಥೆಯ ಸಾಧನೆಗೆ ಸಿಕ್ಕಿತು ರಷ್ಯಾ ಪೇಟೆಂಟ್ ■ 20 ಆಸನ ವ್ಯವಸ್ಥೆ

■ ರಮೇಶ ದೊಡ್ಡಪುರ

7ಡಿ ಆಡಿಟೋರಿಯಂ ಹೊಂದಿರುವ ಅತ್ಯಾಧುನಿಕ ಬಸ್.

ಹಲವು ಉಪಯೋಗ

ಶ್ರೀಪುರಂ ಗೋಲ್ಡನ್ ಟೆಂಪಲ್‌ನಲ್ಲಿ ಬಳಕೆಯಾಗುತ್ತಿರುವ ವಾಹನ

ಹೈಟೆಕ್ ವಾಹನ ರೂವಾರಿಗಳು

1 ಡಾ. ಕೆ. ಗೋಪಾಲಕೃಷ್ಣ
2 ಡಾ. ಎಲ್. ಸಿ. ಮಂಗಳಪ್ಪ ರೆಡ್ಡಿ, ಡಿ
3 ಶಾಮ, ಹೈಟೆಕ್ ಕೋಚ್ ಕಂಪನಿ
4 ಸದಾನಂದ್, ಹೈಟೆಕ್ ಕೋಚ್ ಕಂಪನಿ
5 ಡಾ. ಕೆ. ನಿಮಂತ್ರಾ, ಎಸ್‌ಡಿಲ್ಯೂ‌ಎಫ್

A VISUAL AND AURAL TREAT

T. SARAVANAN

The Hindu: **HOUSEFULL: The 7D experience** Photo: G. Moorthy

The Hindu: **ENTERTAINING: The 7D experience**. Photo: G. Moorthy

The newly opened 7D+ Fun Corner has caught attention with its special effects

Instead of just sitting in your theatre seat watching pictures, how about flying in a war plane? Bullets whiz past you as the fighter pilot flips the aircraft upside down and twirls around to escape his opponent. Water sprays on to your face as the jet travels past a cascade. Though it all feels real, it is a virtual creation, part of the exhilarating experience at the newly opened 7D theatre in the city.

"Please call it as 7D+ Video Ride Simulator," clarifies K. Gopalakrishnan, advisor, 7D+ Fun Corner. "It is an innovative edufotainment venture for the entertainment-starved people of Temple City."

Films with three-dimensional effects are already popular, but 7D is a giant leap in the technology. It brings together an immersive experience on-screen and sensational seat simulation coupled with special effects that are bound to transport the audience to a different world. The simulator combines sophisticated audio-visual equipment including extreme performance control systems and high-end simulation.

The simulator is at the Vishaal de Mal. It has a 24-seater auditorium, control room and power room. The complete 7D+ system consists of motion seats and special effects (SFX), projection or video equipment, audio equipment, motion controllers and drivers, and hardware and software to co-ordinate the synchronisations.

"The entire visual pleasure is built on Stereoscopic 3D Technology or S3D," says Gopalakrishnan. "The technique of enriching the illusion of depth in an image or a video footage by presenting two offset images or video footages separately to the left and right eye of the viewer is called 'stereoscopy' (also called stereoscopic vision or 3D imaging or stereo 3D or S3D)," he explains.

When seated in the motion seat, the guest moves in synchronisation with the events on-screen. "These motion seats are indigenously developed in order to simulate real life sequences that appear on-screen and are powered by pneumatic actuators that makeup the motion base," says Gopalakrishnan.

Each motion base moves in three different axes -- the seats move up and down, forward and backward, and sideways. They also come with flexible air tubes that tickle your ankles, water spray, a butt tickler thrusting upward from the bottom seat cushion, a back poker thrusting forward from the back seat cushion, a seat vibrator, and a powerful jet of air on the back of your neck.

"Cinema theatres screening 3D content can adopt this technology," says Gopalakrishnan. "If not for the whole theatre at least a section can be provided with the facility. We have developed 45 animated contents exclusively for screening in our fun corner," he adds.

With indigenously developed technology, the company aims to provide stereoscopic 3D visualization, animation, intelligent imaging solutions, image enhancement, stereo 3D, 4D, 5D, 6D movies and special effects, stereo 3D learning resources, stereo 3D studios, virtual reality simulators, designing and running games and demonstration of visual or immersive projection technologies.

Gopalakrishnan, who is an alumnus of Thiagarajar College of Engineering, says 7D+ Fun Corner also wishes to help interested researchers in engineering colleges and technical universities in setting up stereo 3D studios or intelligent imaging centres with equipment and training. "We are also interested to nurture and mentor new ventures at various cities including Tier II cities," he says.

The video ride simulator is not recommended for pregnant women and persons with neck or back pain and heart patients. However, all age group in general and kids in particular will enjoy this ride.

The Fun Corner is open from 11 a.m. to 9.30 p.m. on weekdays and from 10 a.m. to 10 p.m. during weekends. Each show is 15 minutes long and a ticket costs Rs.150 on weekends and Rs.130 on weekdays. "For bulk booking and for school students we offer discounts," says P. Sugumaran, another advisor, 7D+ Fun Corner.

At a time when cinema theatres are witnessing a sudden drop in the number of visitors, this technology may bring movie goers back.