21ST JUNE 2025

ICIEST 2025

ABSTRACT & POSTER BOOK

"FOSTERING INNOVATION AND CREATIVITY THROUGH EDUCATION, SCIENCE & TECHNOLOGY"

Organised by:

Education & Advanced Sustainability (EdAS) Unit,
Kolej PERMATA Insan
Universiti Sains Islam Malaysia

OUTLINE

ICIEST 2025

FOREWORD BY

HEAD OF EDAS UNIT

Dr. Siti Munirah Mohd

Bismillahirrahmanirrahim...

Assalamualaikum Warahmatullahi Wabarakatuh.
The 1st International Conference on Innovation in Education, Science, and Technology (ICIEST 2025) marks a significant milestone as the inaugural international conference organized by the Education & Advanced Sustainability (EdAS) research unit at Kolej PERMATA Insan, Universiti Sains Islam Malaysia. This conference offers a dynamic platform for fostering scholarly dialogue and the exchange of ideas among professionals, academics, educators, researchers, and industry experts across the fields of Education, Science, and Technology. In line with EdAS's objectives to drive transformative research, ICIEST 2025 invites the presentation of both completed and ongoing research projects, as well as innovative educational and science and technology products that contribute to the advancement of knowledge and practice in the fields of Education, Science and Technology.
ICIEST 2025 welcomes interdisciplinary participation, fostering a collaborative environment that bridges research and practice. It serves as a venue for showcasing innovative approaches, building academic partnerships, and inspiring future developments in key areas of science, technology, and Education. Through keynote and invited speeches, parallel sessions, and innovation, ICIEST 2025 aims to stimulate intellectual exchange and support the dissemination of impactful research and practices. The event is bolstered by the collaboration of Persatuan Tadika Islam Malaysia (PERTIM) and Universitas Islam Bunga Bangsa Cirebon, Indonesia, as co-organizers. As the academic and professional communities gather for this inaugural event, ICIEST 2025 warmly welcomes all participants to be part of a meaningful journey of knowledge exchange, innovation, and collaboration.

May ICIEST 2025 be a catalyst for new partnerships, academic inspiration, and sustainable advancement for all involved.
Wishing all participants a rewarding and engaging experience at ICIEST 2025.
Thank you

Dr. Siti Munirah Mohd
Head of EdAS Unit

FOREWORD BY

CHAIR OF ICIEST 2025

Datin Dr. Diani Mardiana Mat Zin

Bismillahirrahmanirrahim..

Assalamualaikum Warahmatullahi Wabarakatuh

It is with great pride and enthusiasm that I welcome you to the 1st International Conference and Innovation on Education, Science, and Technology (1st ICIEST 2025). With the theme "Fostering Innovation and Creativity Through Education, Science & Technology," ICIEST 2025 emphasizes the vital role that interdisciplinary research and knowledge-sharing play in addressing global challenges and shape a better future. This conference brings together a diverse and dynamic community of scholars, researchers and industry professionals, offering a vibrant platform for the exchange of ideas and the forging of meaningful collaborations in Education, Science and Technology.

This conference would not have been possible without the tireless efforts of many individuals and institutions. We extend our sincere gratitude to our collaborators (Persatuan Tadika Islam Malaysia (PERTIM) and Universitas Islam Bunga Bangsa Cirebon, Indonesia), the Program Committee and external reviewers for their commitment to maintaining high academic standards.

We are also pleased to feature keynote presentations by distinguished experts [Professor Dr. Nordin Mamat from UPSI and Assoc. Prof. Ts. Dr. Mohd Shaiful Sajab from UKM], who will share their insights into current trends and future directions in science and technology.

To all our authors and participants-thank you for being part of this landmark event. Your contributions and engagement are central to the success of ICIEST 2025.
We hope that this conference will serve not only as a forum for sharing research but also as a starting point for long-term collaborations and innovations that benefit both academia and society.

Datin Dr. Diani Mardiana Mat Zin
Chair of ICIEST 2025

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ICIEST 2025

KEYNOTE SPEAKER

Prof. Dr. Nordin bin Mamat

Expert in Curriculum in Early Childhood Education, Parenting and Children Social Behaviour
Universiti Pendidikan Sultan Idris, UPSI
The Transformation of 21st Century Education To Prepare Excellent Learning In The Era of Society 5.0

Assoc. Prof. Ts. Dr. Mohd Shaiful Sajab

Expert in Material Sciences
Universiti Kebangsaan Malaysia, UKM
Exploring lignocellulose-based biopolymers for functionalized additive manufacturing

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PAPER PRESENTATION

EDUCATION

ID: ED001

The Synergy of Artificial Intelligence and Experiential Learning in Cultivating Student Creativity and Innovation

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ABSTRACT

Artificial Intelligence (AI) integration in education offers innovative approaches to enhance learning outcomes, particularly creativity and innovation. Traditional educational methods often lack the capacity to foster these essential skills. This study aims to evaluate the effectiveness of combining AI-assisted tools with experiential learning activities in improving creativity and innovation among students. A mixed-methods approach was employed, involving 150 participants in experimental learning modules and qualitative interviews to gather insights. Results revealed significant improvements in creativity and innovation scores, with students demonstrating increased engagement and critical thinking. The findings highlight the potential of AI-enhanced experiential learning to address educational gaps and equip learners with skills needed for future challenges. This study contributes by providing a framework for integrating AI and experiential learning into education, paving the way for transformative and innovative educational practices.

Keywords: *Artificial Intelligence, Experiential Learning, Creativity, Innovation, Educational Practices*

EDUCATION

ID: ED003

Penggunaan Pelan Intervensi Transformasi Sekolah (PinTas) dan *Outcome Performance Planning Matrix* (OPPM) dalam Menerajui Kepimpinan: Kajian Tinjauan

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ABSTRAK

Pelan Intervensi Transformasi Sekolah (PinTas) dan Outcome Performance Planning Matrix (OPPM) adalah sebahagian daripada usaha Kementerian Pendidikan Malaysia (KPM) untuk mentransformasi sistem pendidikan, khususnya dalam mencapai matlamat dan visi yang telah ditetapkan dalam inisiatif Transformasi Sekolah 2025 (TS25). Tujuan kajian ini adalah untuk meninjau impak perlaksanaan PinTas dan OPPM terhadap guru-guru di sebuah sekolah TS25 di utara Malaysia. Kajian dilaksanakan secara kualitatif dan melibatkan 5 orang responden yang terdiri daripada pasukan pemimpin kanan sekolah yang dipilih secara rawak bertujuan. Bagi tujuan pengumpulan data, temubual dan analisis dokumen dilaksanakan. Transkrip temubual dianalisis secara manual. Hasil analisis menjelaskan bahawa pemimpin sekolah menunjukkan sikap yang positif terhadap pelaksanaan TS25 yang dianggap sebagai langkah penting dalam meningkatkan mutu pendidikan dan pencapaian sekolah. Ketersediaan sumber, komitmen guru, dan sokongan daripada pihak pengurusan pendidikan yang lebih tinggi mempengaruhi keberkesanan penggunaan PinTas dan OPPM . PinTas dan OPPM memberikan kerangka kerja yang jelas untuk perancangan dan penilaian strategi pengurusan, dan membantu mereka dalam memantau kemajuan sekolah dengan lebih berstruktur. Hal ini, membuktikan fungsi positif PinTas dan OPPM dalam meningkatkan prestasi dan kualiti sekolah melalui pelbagai intervensi berstruktur dan sistematik . Jesteru PinTas dan OPPM perlu terus diperkasakan.

Kata Kunci: *Impak, Pelan Intervensi Transformasi Sekolah, PINTAS, OPPM, Intervensi, TS25*

EDUCATION

ID: ED004

Malaysian Youth & Political Socialization: Navigating Democracy, Leadership, and Global Citizenship

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ABSTRACT

Youth play a critical role in shaping the future of any nation, and their involvement in politics is essential for democratic progress and leadership development. In Malaysia, however, political socialization among youth faces various challenges. Despite efforts to engage youth in political processes, the level of political literacy remains low, as evidenced by the decrease from 60.31% in the IBM 2021 survey to 58.64% in IBM 2022 within the domain of Political Socialization, Citizenship, and Democracy. This study explores the factors contributing to this decline, examining how global citizenship, democratic understanding, and leadership skills influence youth engagement in political activities. The research aims to analyze the current state of political literacy among Malaysian youth, identify barriers to effective political socialization, and propose strategies to enhance youth involvement in the political process and global citizenship.

Keywords: *Political Socialization, Youth Engagement, Democracy, Global Citizenship, Political Literacy, Leadership, Malaysia, Political Education*

EDUCATION

ID: ED005

Integration Program Plus Career Skills Based on Information and Communication Technology with Islamic Approach

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ABSTRACT

The development of education in Indonesia continues to progress along with advancements in technology and communication in the digital era. The role of technology and information in national education actively and effectively contributes to improving the quality of education in science and technology. Difficulties in choosing a future career occur among students at Madrasah Aliyah Negeri (MAN) 2 Kota Cirebon. This conflict arises due to challenges in understanding technology and communication. This study aims to raise awareness of education in Indonesia by utilizing communication technology, which can be developed adaptively and reliably. Choosing a future career early in school can enhance psychological maturity in facing life challenges in the technological era. This research employs a qualitative approach, with data collected through observation and interviews. The study took place at MAN 2 Kota Cirebon, Indonesia, from November to December 2024. The research subjects consist of counseling teachers, physics teachers, curriculum staff, and four twelfth-grade students from the Mathematics and Natural Sciences program. The specialized skills program is related to internal and external factors in career decision-making across three areas of expertise available at MAN 2 Kota Cirebon. The research findings indicate that the competence level of educators as facilitators in the education sector plays a central role in a student-centered collaborative concept. Through effective and efficient communication, educators can deeply synergize to develop their potential in understanding the technology-based learning process and mechanisms. The three areas of expertise include **Motorcycle Engineering and Business (TBSM), Culinary Arts, and Multimedia**. With these skills, twelfth-grade Mathematics and Natural Sciences students at MAN 2 Kota Cirebon are expected to make more mature and future-oriented career decisions. Additionally, students will be better prepared to face competition in higher education and the workforce.

Keywords: *Skills Program; Information and Communication Technology; Career; Islamic Education.*

EDUCATION

ID: ED006

Awareness of PERMATA@Pintar Nation Center Students about BINGO Game as Aid Tool in Teaching and Learning

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ABSTRCT

Gamification is an effective method for engaging students and sustaining their interest in learning. Educational games like Bingo incorporate elements like points and badges to enrich the learning experience. Playing Bingo can enhance cognitive function, communication skills, and critical thinking by encouraging active learning rather than passive memorization. This study aimed to evaluate students' awareness at the PERMATA@SMART Nation Center regarding using Bingo as a teaching tool. The research was conducted through purposive sampling, involving an online survey with students aged 12 to 17. The results indicated that while many students play Bingo, most are unaware of its educational potential. Therefore, it is recommended that Bingo games be formally introduced as a tool in the national curriculum.

Keywords: *Bingo; gifted students; gamification; education 4.0*

EDUCATION

ID: ED007

Probabilistic Thinking of Undergraduate Male Mathematics Education Students in Solving Probability Problems Involving Binomial Distribution Based on Field-Independent Cognitive Styles

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ABSTRCT

This study explores the probabilistic thinking of a male undergraduate mathematics education student characterized by a masculine gender trait and a field-independent (FI) cognitive style. The subject, referred to as MLI (Male, Field-Independent), was selected through purposive sampling based on gender traits, results from the Group Embedded Figures Test (GEFT), and mathematical ability assessed through UTBK SBMPTN questions. Most students tested were classified as having moderate mathematical ability, and the MLI subject was selected accordingly. Using a descriptive qualitative approach with a case study design, the study aimed to analyze the subject's approach to solving a probability problem involving binomial distribution. Data were gathered through a problem-solving task administered at the Faculty of Teacher Training and Education, Universitas Sembilanbelas November Kolaka. The data analysis process included data reduction, presentation, and conclusion drawing. Findings revealed that the MLI subject successfully applied Polya's four-step problem-solving model understanding the problem, devising a plan, carrying out the plan, and looking back. Although formulas were not explicitly written, the subject demonstrated clear logical structure and accurate reasoning. Reflective thinking was confirmed through interviews. These results highlight the need to develop probabilistic thinking in mathematics education to support effective teaching and real-world decision-making.

Keywords: *Probabilistic Thinking; Field-Independent Cognitive Style; Binomial Distribution; Probability Problem Solving; Male Undergraduate Students*

EDUCATION

ABSTRACT

PAPER PRESENTATION

SCIENCE & TECHNOLOGY

ID: ST001

Entanglement Classification Operator Model Development of SU(2)

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ABSTRACT

YThe study presents the development of the SU(2) operator model for entanglement classification within the Local Unitary (LU) protocol. The operator model was systematically designed, specifically tailored for the pure three-qubit quantum system to accurately identify the distinct classes of entanglement. By leveraging the special unitary group, SU(2), this operator model development benefits researchers to gain a better understanding of the essence of entangled states, assisting researchers in effectively harnessing them to numerous potential applications in quantum computing, quantum cryptography, quantum teleportation and other respective fields. Hence, the study contributes significantly to advancing quantum information science. Furthermore, the foundation of this study establishes a broad pathway for advancements and future innovation in quantum information science and technologies.

Keywords: *Special unitary group; Local Unitary; LU; Entanglement classification*

ID: ST002

Experimental Study of Surface Integrity during Turning of Aluminum Metal Matrix Composite

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ABSTRACT

Metal matrix composite (MMC) have many advanced mechanical properties such as high wear resistance, less weight, high strength and stiffness, lower coefficient and high thermal conductivity, which are widely used in the automotive, railway and aerospace industries. The main limitation in MMC application is difficult to machine, which leads to low production volumes and high machining costs. This study aims to investigate the influence of machining parameters on the surface integrity of Aluminum metal matrix composite that was carried out on NC lathe under dry cutting condition. The most significant machining parameters in turning were cutting speed and feed rate that hugely control the surface roughness. Moreover, the tool wear influences the surface roughness of the work piece. The results would serve to understand the machining process better, provide inputs that can ensure better machining of MMC thus expected to lead technological and economical gains.

Keywords: *Metal matrix composite; surface integrity; cutting speed; tool wear*

ID: ST003

Study of Narrow Energy Band Gap Polymer Matrix in Organic Field-Effect Transistor-based Biosensor

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ABSTRACT

In this project, triisopropylsilylethynyl-pentacene (TIPS-pentacene) will be utilized as a semiconducting polymer matrix for the preparation of biosensors based on organic field-effect transistor (OFET) structure. A thin layer of TIPS-pentacene can be easily formed on a silicon substrate through solution processable technique, giving an advantage to incorporate a protein-based antibody biomarker into polymer matrix for disease detection. Through polymer blend method which allows synergistic combinations of stacking configurations of multiple polymers energy levels which will enhance overall charge transport. Novel pentacene derivatives will also be proposed using machine learning method and computational study for synthesizing new narrow energy band gap polymer matrix. Analytical techniques, such as cyclic voltametric (CV), ultraviolet-visible (UV-Vis) spectroscopy, Raman spectroscopy, X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM) will be used in the characterization of the materials properties. The proposed biosensor based on integration of biological compound into OFET will facilitate the government.

Keywords: *Triisopropylsilylethynyl-pentacene; organic field-effect transistor; semiconducting polymer matrix; biosensor*

SCIENCE & TECHNOLOGY

ID: ST004

Fabrication of 3D-Printed Flow Cell Biosensor for Pathogenic Escherichia *coli* Bacteria Detection

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ABSTRACT

This research seeks to develop an innovative 3D-printed biosensor for the rapid and accurate detection of Escherichia *coli* (E. *coli*) bacteria in water samples. The proposed biosensor will incorporate a flow cell design, which allows continuous monitoring and efficient detection of E. *coli* in real-time. The sensor will be fabricated using conductive polymer-based materials integrated with specific biological recognition elements to ensure high sensitivity and specificity. The 3D printing technology will be utilized to create a precise and reproducible flow cell structure, optimizing the sensor's functionality and scalability. The research will proceed through several key phases: designing and simulating the flow cell structure, selecting and functionalizing the sensing materials, fabricating the biosensor using 3D printing techniques, and conducting extensive testing with water samples containing various concentrations of E. *coli.* This research will establish a foundation for future advancements in portable and effective biosensing devices for early detection of bacterial contamination.

Keywords: *Escherichia coli; Biosensor; Flow Cell; Aptamer; 3D printing*

ID: ST005

Study OF Biophysical Mechanisms of Aptamer-based Biosensor for Detection of Phatogenic Escherichia *coli*

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ABSTRACT

The increasing prevalence of pathogenic Escherichia *coli* (E. *coli*) in water and food sources poses a significant threat to public health, necessitating the development of rapid and accurate biosensor detection methods such as aptamer-based biosensors due to their high specificity and sensitivity. This research aims to investigate biophysical mechanisms by utilizing biophysics simulations such as molecular dynamics (MD) simulations to elucidate the interaction between a specific aptamer with E. coli protein. This research also focusses on the colorimetric detection mechanism based on the aggregation of silver nanoparticles (AgNPs) as it is a straightforward indicator when aptamer binds to E. *coli*. The methodology involves characterizing aptamer-E. *coli* interactions, identifying key aptamer structural features, studying environmental effects, and linking aptamer binding to AgNPs colorimetric response. In conclusion, this research bridges theory and experiments application, providing a framework for developing advanced biosensing technologies, especially colorimetric detection methods for rapid and accurate E. *coli* identification.

Keywords: *Escherichia coli; Biosensor; Aptamer; Colorimetric; Molecular Dynamics*

ID: ST006

Fabrication of Solution-Processed Perovskite Solar Cells

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ABSTRACT

Fossil fuels contribute to air pollution, harming human health and ecosystems. Burning fossil fuels increases greenhouse gas concentrations, trapping more heat in the Earth's atmosphere and causing global temperatures to rise. Transitioning to solar energy can reduce pollution, as solar power emits no harmful pollutants. Perovskite solar cells are a promising advancement in solar technology, offering efficiency comparable to or greater than silicon cells. They can be manufactured using simpler and less expensive processes, making them a cost-effective alternative for solar energy generation. This research aims to synthesize perovskite precursors with temperature treatment to improve their physical and chemical properties, evaluate their performance in terms of power-conversion-efficiency (PCE) and study device lifetime. Temperature treatment can enhance crystallinity, morphology, and stability, leading to improved device performance. Additionally, temperature treatment can influence the formation of interfaces between perovskite layers and other charge transport layers and improving overall device performance.

Keywords: *Solar cells; temperature; perovskite; performance*

ID: ST008

Solution of Monkeypox Transmission Model Using Modified Picard Iterative Method

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ABSTRACT

Monkeypox, an emerging zoonotic disease with increasing human-to-human transmission, requires accurate mathematical modeling to understand its spread dynamics and guide effective public health interventions. Although numerical approaches are essential for addressing these models, issues with computational efficiency and dependability still exist. This study introduces a Modified Picard Iterative Method (MPIM) as a novel approach to solving the monkeypox transmission model, an eight-dimensional system of nonlinear ordinary differential equations. Unlike traditional Picard Iterative methods which are only reliable for short-term predictions, MPIM demonstrates consistent reliability in both short- and long-term simulations, ensuring accuracy comparable to the fourth-order Runge-Kutta (RK4) method throughout the entire time frame of the model. By offering a robust and efficient alternative to classical numerical techniques, the Modified Picard Iterative Method provides valuable insights into monkeypox transmission dynamics and contributes to the advancement of computational methods in infectious disease modeling.

Keywords: *Monkeypox; Modified Picard Iterative Method; Infected Case; Convergence*

ABSTRACT

INNOVATION

EDUCATION

ID: IE001

Smart Tasrif: An Innovative Tool for Learning Arabic Sarf Using a Game-Based Approach

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ABSTRACT

Knowledge of the fundamental structure of words is crucial for mastering Arabic language skills such as reading, writing, listening, and speaking. The accurate application of word patterns facilitates correct pronunciation of Arabic words and expands vocabulary. However, the complexity of Arabic word structures makes it challenging for beginner-level students to grasp within a short time. Reliance on rote memorization of wazan (word patterns) often renders the study of Sarf (Arabic morphology) dull and monotonous. This situation diminishes students' interest and motivation to learn Arabic. To address this issue, Smart Tasrif was developed as an innovative tool designed to simplify the process of learning Sarf. The primary objective of Smart Tasrif is to provide an interactive board game to make learning tasrif engaging and enjoyable. Research findings indicate that Smart Tasrif enhances students' interest and motivation in learning Arabic morphology. The hands-on, repetitive learning activities help sharpen students' retention of tasrif. Moreover, the integration of gamification elements and visual features of the board game makes the learning experience more captivating and effective.

Keywords: *Gamification, Arabic Sarf, Board Games, Innovation*

EDUCATION

ID: IE002

Youth and Political Socialization: Challenges and Opportunities for Malaysia's Future in the Context of Democracy, Leadership, and Global Citizenship

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ABSTRACT

Youth play a critical role in shaping the future of any nation, and their involvement in politics is essential for democratic progress and leadership development. In Malaysia, however, political socialization among youth faces various challenges. Despite efforts to engage youth in political processes, the level of political literacy remains low, as evidenced by the decrease from 60.31% in the IBM 2021 survey to 58.64% in IBM 2022 within the domain of Political Socialization, Citizenship, and Democracy. This study explores the factors contributing to this decline, examining how global citizenship, democratic understanding, and leadership skills influence youth engagement in political activities. The research aims to analyze the current state of political literacy among Malaysian youth, identify barriers to effective political socialization, and propose strategies to enhance youth involvement in the political process and global citizenship.

Keywords: *Political Socialization, Youth Engagement, Democracy, Global Citizenship, Political Literacy, Leadership, Malaysia, Political Education*

EDUCATION

ID: IE005

Aplikasi Inovatif Sistem Pneumatik dalam Rekabentuk Mesin Ramming untuk PdP Bengkel Foundri

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ABSTRACT

Inovasi Mesin Pneumatic Ramming bagi aplikasi Pengajaran dan Pembelajaran (PdP) di bengkel foundri dibangunkan sebagai alat sokongan kepada proses latihan foundri, khususnya dalam pemadatan pasir untuk penyediaan acuan. Dalam proses peleburan logam, kualiti acuan memainkan peranan penting dalam menentukan ketepatan dimensi dan kemasan permukaan produk tuangan. Kaedah pemadatan secara manual sering kali menyebabkan ketidakseragaman dan memakan masa serta boleh menjejaskan kualiti pembelajaran dan hasil acuan. Oleh itu, mesin ini direka dengan menggunakan sistem pneumatik yang lebih mudah diselenggara dan kos efektif yang menjadikannya sesuai untuk persekitaran bengkel pengajaran. Reka bentuk mesin ini melibatkan pemadat segi empat tepat bersaiz 250mm × 200mm × 4mm yang digunakan dalam kotak acuan bersaiz 251mm × 201mm × 75mm. Mesin ini digerakkan oleh silinder pneumatik berdiameter 32mm dengan panjang lejang 200mm. Melalui ujian prestasi yang dijalankan, masa yang diperlukan untuk proses pemadatan menggunakan mesin ini ialah 10 minit 9 saat, berbanding 12 minit 11 saat secara manual. Ini menunjukkan penjimatan masa dan peningkatan keberkesanan dalam proses PdP. Selain itu, maklum balas daripada pensyarah dan pelajar menunjukkan bahawa mesin ini membantu memberikan pengalaman pembelajaran yang lebih menyerupai amalan industri sebenar. Kesimpulannya, inovasi ini bukan sahaja berjaya meningkatkan kecekapan pemadatan pasir, malah berpotensi untuk diterapkan secara lebih meluas dalam pendidikan teknikal sebagai alat bantu mengajar yang praktikal dan relevan dengan keperluan industri semasa.

Keywords: *Mesin pneumatic ramming, pemadatan pasir, pengajaran dan pembelajaran (PdP), bengkel foundri, sistem pneumatik.*

ABSTRACT

INNOVATION

SCIENCE & TECHNOLOGY

ID: ISO01

POFA-PET Incorporated Concrete For Gamma Ray Shielding

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ABSTRACT

Gamma-ray shielding research is critical in industries ranging from medical radiography to nuclear power, where high-energy gamma radiation poses serious health concerns and practical obstacles. Traditional insulation materials such as lead are effective but often have disadvantages. Recent research has concentrated on producing novel materials that provide excellent gamma ray attenuation and have increased sustainability and economic benefits. This study paper combines Palm Oil Fuel Ash (POFA) and Polyethylene Terephthalate (PET) waste into concrete mixtures to create a new, environmentally friendly gamma ray shielding material This research aims to improve the protective qualities of concrete mixtures by adding POFA and PET and to compare the mechanical properties of this incorporated mixer concrete with standard concrete. High quantities of silica are reported to be present in POFA made from palm oil, which can increase the durability and strength of concrete. Concrete's qualities and impacts can be enhanced using the polymer PET. The research entailed carrying out multiple trials to ascertain the ideal ratio of POFA to PET in concrete mixes. The compressive strength, water absorption, and gamma-ray attenuation characteristics of POFA-PET will be assessed. Additionally, the components of the concrete mixture interact chemically and microstructurally. The findings of this investigation will offer crucial information on the possible uses of POFA-PET blends as materials for gamma-ray shielding.

Keywords: *Concrete, POFA-PET, Gamma, Shielding*

SCIENCE & TECHNOLOGY

ID: ISO03

Innovation from Newton's Law

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ABSTRACT

Newton's Third Law of Motion asserts that, "For every action, there is an equal and opposite reaction". What this means is that when one object exerts a force on a second object, there must be an equal but opposite force of equal magnitude on the first object. In this sense, the two forces always have the same magnitude but act in opposite directions, and occur simultaneously. Next, is about the action and reaction forces are the same size but act in opposite directions they act on different objects. These forces form the basis for understanding the interaction between moving objects and are applied to different forces such as gravity, friction and contact forces such as push or pull. Then, we include some examples like walking, where your feet push back against the ground (action), and the ground pushes you forward (reaction). Then, rocket propulsion where the rocket pushes the gas down (action), while the gas pushes the rocket up (reaction). Additionally, newton's Third law has helped in defining the reciprocal nature of forces in a way that sheds some light on our understanding of everyday life phenomena despite advancing physics.

ID: IS004

Automatic Hole Puncer and Stapler

Alya Nabila Mohamad Azli[1], Nur Alieya Batrisya Mohd Ramlee[1], Nur Irdina Afiqah Irwan[1], Nurul Armayuza Aishah Mohd Asmadi[1] & Siti Amira Othman[1,*]

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Boyle's law is one of the gas laws that states the Pressure of gases, P and Volume of gases, V are inversely proportional to each other. The temperature and the amount of gases will remain constant. In another case, When the temperature is constant, the product of its pressure and volume is also constant. Boyle's law also describes if the volume of gases increases, the pressure of gases will be decreased. If the volume of gases decreases, the pressure of gases will increase. In this case, the temperature will always be equal or constant. In our innovation, we are using an electropneumatic system for moving a pneumatic cylinder that will be working as an automatic stapler and puncher. An electro-pneumatic system is a system that uses both electrical and compressed air technology. In this case, the air compressor will release the gases, and they will enter the pneumatic cylinder. Thus, the pneumatic cylinder is the component where Boyle's law is applied.

ID: ISO05

Smart Hydraulic Suspension Systems in Vehicles

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The suspension systems in automobiles are creditworthy for driving safety and comfort because the suspension takes the vehicle's sprung mass (body) weight and conveys all the forces which act between the automobile body and the road surface. The vehicle suspension system consists of springs, shock absorbers, usually called dampers and mechanical linkages known as wishbones to transmit and also filter all the forces between the vehicle body and the road. The springs accommodate the vehicle's body mass and have a cushion effect against road disturbances, thus contributing to driving safety. The shock absorbers absorb the vehicle body and wheel oscillations, thus contributing to both driving safety and comfort. More so, a suspension system reduces the loss in traction that occurs between the tyre and road by sustaining road holding ability, thus improving vehicle road handling. Due to the implicit contradictory nature of the system performance in the vehicle suspension systems, the problem becomes large for improved solutions to be recovered by researchers. Three primary types of automobile suspension systems, that is to say, passive systems, semi, and fully active systems, were studied to accomplish automobile required performances and to stay clear of the trade-off. Passive vehicle suspension systems are the conventional mechanical arrangements consisting of linear springs and viscous damper with constant stiffness and damping coefficient. Most of today's commercial vehicles utilize passive suspensions in controlling dynamic vertical motions in vehicles as well as the vehicle roll and pitch motion.

ID: IS006

Innovation from Newton's Third Law

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Pascal's law (also Pascal's principle or the principle of transmission of fluid-pressure) is a principle in fluid mechanics given by Blaise Pascal that states that a pressure change at any point in a confined incompressible fluid is transmitted throughout the fluid such that the same change occurs everywhere.The law was established by French mathematician Blaise Pascal in 1653 and published in 1663. Pascal's principle is defined as a change in pressure at any point in an enclosed incompressible fluid at rest is transmitted equally and undiminished to all points in all directions throughout the fluid, and the force due to the pressure acts at right angles to the enclosing walls. In this report, we will explain about the hydraulic system in Pascal's law. A hydraulic system is a mechanical system that uses pressurised fluids (typically oil or water) to transmit force and perform work. The key principle behind hydraulic systems is Pascal's Law, which states that pressure applied to an incompressible fluid in a confined space is transmitted equally and undiminished in all directions. This property of fluids allows for the efficient transfer of force, enabling a small input force to produce a much larger output force, making hydraulic systems extremely powerful and useful in various applications. This principle allows hydraulic systems to amplify force by utilizing a relatively small input force and converting it into a much larger output force.

POSTER
INNOVATION

EDUCATION

POSTER ID: IE001

SMART TASRIF: AN INNOVATIVE TOOL FOR LEARNING ARABIC SARF USING A GAME-BASED APPROACH

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INTRODUCTION

A strong understanding of word structure fundamentals is essential for mastering Arabic language skills such as reading, writing, listening, and speaking. The accurate application of word patterns facilitates correct pronunciation of Arabic vocabulary while expanding one's lexicon. However, the complexity of Arabic word structures poses a challenge for beginner learners, making it difficult to grasp within a short period. Relying heavily on memorizing wazan patterns often renders ṣarf learning dull and monotonous, leading to a decline in students' interest and motivation to study Arabic. To address this issue, Smart Tasrif was developed as an innovative tool designed to simplify the ṣarf learning process. Its primary objective is to introduce an interactive board game that makes tasrif learning more engaging and enjoyable. Research findings indicate that Smart Tasrif enhances students' interest and motivation in learning Arabic morphology. Hands-on and repetitive learning activities sharpen students' mastery of tasrif, while the integration of gamification elements and visually appealing board game designs makes the learning experience more engaging and effective.

PROBLEM STATEMENT

Arabic morphology learning is often regarded as a significant challenge, particularly for non-native Arabic learners. The complex Arabic morphological system, with its various word pattern structures (wazan) requires students to memorize and comprehend numerous intricate word forms. The difficulty in recalling these patterns frequently leads to boredom and a lack of motivation to learn Arabic morphology (Siti Rohani, 2024). Traditional teaching methods that rely solely on rote memorization hinder students from effectively applying the correct word patterns when constructing sentences (Azani, 2012).Therefore, a more interactive and engaging learning approach is needed to help students understand and master Arabic morphology more effectively. The integration of games in learning is considered an innovative approach that promotes active participation and motivates students to engage in the learning process (Bayeck, 2020; Furdu et al., 2017; Lee & Hammer, 2011). By incorporating game-based learning in Arabic morphology instruction, students are encouraged to actively participate in lessons, fostering a more immersive and effective learning experience.

OBJECTIVES

1-To Analyze SMKA students Arabic Morphology achievement after the Pre-Test

2-To Analyze SMKA students Arabic Morphology achievement after the Post-Test

METHODOLOGY

This study employs a quasi-experimental method with a pre-test and post-test design to evaluate the effectiveness of Smart Tasrif in enhancing students' achievement in Arabic morphology. The study sample consists of 80 students, selected through purposive sampling. The data collection methods involve two main instruments: achievement tests and observational analysis. The achievement tests include pre-tests and post-tests, which measure students' understanding before and after using Smart Tasrif. The collected data is analyzed using a paired t-test to determine significant differences in students' achievement between the pre-test and post-test. Mean scores, standard deviation, and significance levels are used to evaluate the impact of the intervention on students' mastery of Arabic morphology, including verb conjugation (taṣrīf al-afʿāl), derivation (al-mushtaqqāt), and nominalization (maṣdar).

RESULT

Type of Test	N	Mean	SD	t-value	Significant
Pre-test	80	40.91	11.42	-7.489	.000
Post-test	80	54.19	10.99		

T-Test for Differences in Students' Achievement Between Pre-Test and Post-Test

Based on Table 4.2, the t-value for the difference in students' overall achievement between the pre-test and post-test is t = -7.489, with a significance level of p = .000. Since the significance level is smaller than 0.05 ($p < 0.05$), this indicates a statistically significant difference in students' achievement between the pre-test and post-test. This result suggests that the learning intervention had a positive impact on students' performance in Arabic morphology.

DISCUSSION

Smart Tasrif offers an innovative solution to help students overcome difficulties in learning tasrif through an engaging game-based approach. This method enhances students' understanding, motivation, and interest in Arabic morphology. Smart Tasrif not only benefits students by improving their mastery of Arabic grammar but also fosters a more collaborative and effective learning environment. The integration of game-based learning in tasrif has high commercial potential and the capability to be expanded into digital platforms, making Smart Tasrif a relevant and valuable tool in Arabic language education.

CONTRIBUTION TO SOCIETY

Smart Tasrif contributes significantly to society by making Arabic language learning more accessible and engaging, particularly for students who struggle with traditional rote memorization methods. By integrating gamification, Smart Tasrif fosters an inclusive learning environment that caters to diverse learning styles, ensuring that students from various backgrounds can grasp Arabic morphology effectively. Additionally, the collaborative nature of the game encourages teamwork and communication, instilling essential social and cognitive skills among learners. Beyond the classroom, Smart Tasrif has the potential to benefit educators, parents, and language enthusiasts by providing an interactive tool that enhances Arabic literacy in both formal and informal settings.

EDUCATION

POSTER ID: IE002

Sosialisasi Politik Belia: Cabaran dan Peluang untuk Masa Depan Malaysia dalam Konteks Demokrasi, Kepimpinan dan Kewarganegaraan Global

PENGENALAN

Perkembangan semasa menunjukkan paradoks yang menarik - walaupun belia Malaysia menunjukkan peningkatan dalam Indeks Pembangunan Belia Global (0.802 pada 2023

OBJEKTIF KAJIAN

- Menganalisis Tahap Literasi dan Penglibatan Politik Belia
- Menilai keberkesanan Program Sosialisasi Politik Sedia Ada
- Membangunkan Model Sosialisasi Politik Inovatif

PENYATA MASALAH

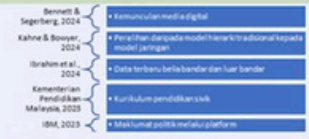
Kajian ini amat signifikan untuk mengenalpasti punca-punca akar umbi masalah sosialisasi politik belia dan seterusnya mencadangkan penyelesaian holistik yang bersesuaian dengan konteks sosio-politik Malaysia yang unik.

TUJUAN KAJIAN

Kajian ini bertujuan untuk menganalisis secara komprehensif mekanisme sosialisasi politik dalam kalangan belia Malaysia berumur 15-30 tahun.

Tinjauan Literatur

KERANGKA KONSEP KUALITI & KESEJAHTERAAN MELALUI *NATIONAL KEY YOUTH DEVELOPMENT AREA* (NKYDA) 2021-2025



METODOLOGI

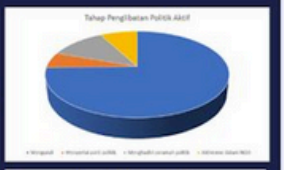
Pendekatan	• Campuran (*Mixed-method*)
Peserta	• Kuantitatif (5,414 peserta berumuar 15-30 tahun) • Kualitatif (60 peserta)
Pengumpulan Data	Soal selidik IBM 2023. Protokol FGD
Analisis Data	Analisis statistis dan thematic coding

DAPATAN KAJIAN / PERBINCANGAN

PEMBERAT DOMAIN IBM'23

BIL	DOMAIN	PEMBERAT (%) GLOBAL	ASEAN	MALAYSIA
1.	PENDIDIKAN	25% (Global Youth Index, 2016)	30% (Youth Development Index, 2017)	20.0%
2.	EKONOMI	25% (Global Youth Index, 2016)	30% (Youth Development Index, 2017)	20.0%
3.	KESEJAHTERAAN MENTAL & FIZIKAL	25% (Global Youth Index, 2016)	30% (Youth Development Index, 2017)	20.0%
4.	SOSIALISASI POLITIK, KENEGARAAN & DEMOKRASI	15% (Global Youth Index, 2016)	-	15.0%
5.	NILAI & IDENTITI	10% (Global Youth Index, 2016)	10% (Youth Development Index, 2017)	12.5%
6.	MEDIA & DIGITAL CITIZENSHIP	10.94% (The Global Youth Wellbeing Index, 2017)	-	12.5%
	JUMLAH	-	100%	100%

Kewujudan polisi berkaitan pembangunan belia	Kewujudan pendidikan pengundi (*voter education*)
Kebebasan bersuara belia	Perbincangan politik, kenegaraan dan demokrasi
Patriotisme	Penyertaan dalam aktiviti politik, kenegaraan dan demokrasi
Mengikuti perkembangan aktiviti politik, kenegaraan dan demokrasi	Semangat perpaduan



Implikasi Dasar Kerajaan

- Kurikulum Pendidikan Sivik perlu disusun semula.
- Program belia kerajaan perlu dijenamakan.
- Pembangunan infrastruktur di kawasan luar bandar.

Model Sosialisasi Politik Hibrid Malaysia dicadangkan sebagai kerangka untuk meningkatkan literasi dan penglibatan politik belia.

Dapatan kajian menyerlahkan keperluan untuk pendekatan yang lebih dinamik dan inklusif dalam memupuk generasi warganegara yang berpengetahuan dan aktif.

RUMUSAN

Walaupun belia Malaysia semakin terdedah kepada maklumat politik melalui platform digital, tahap literasi politik mereka masih berada pada tahap yang membimbangkan, dengan hanya 32% menunjukkan kefahaman asas tentang proses demokrasi.

Halangan Utama

- Kurang akses maklumat politik dipercayai.
- Sikap apolitik yang semakin meningkat.
- Jurang digital bandar, luar bandar.
- Program kerajaan yang tidak menyeluruh,

Penambahbaikan

- Penyusunan semula kurikulum pendidikan sivik dengan penekanan pada pembelajaran pengalaman
- Pelancaran kempen kesedaran politik bersepadu merentas pelbagai platform media

Rujukan

Penyelidik Nur Atika Binti Hairi
Aida Zulaikha Binti Zulkefly
Aisya Khadijah Binti Mohd Hamidi
Andi Nur Nabilah Syafiqah Binti Bacho
Aida Zukrina Binti Zulkefly

EDUCATION

POSTER ID: IE005

APLIKASI INOVATIF SISTEM PNEUMATIK DALAM REKABENTUK MESIN RAMMING UNTUK PDP BENGKEL FOUNDRI

NAMA : ISMANIZA BINTI ISMAIL
NORIDA BINTI MOHAMMAD NOOR
FARIDAH BINTI SALLEH

INSTITUSI : POLITEKNIK UNGKU OMAR

LATAR BELAKANG

Proses pembuatan acuan pasir dalam kerja foundri memerlukan proses pemadatan (ramming) yang teliti untuk memastikan acuan pasir yang dihasilkan cukup padat dan tidak mudah rosak ketika proses penuangan logam.

PENYATAAN MASALAH

Proses ramming sering dilakukan secara manual menggunakan pemukul tangan. Kaedah ini bukan sahaja memakan masa malah kurang efisien dan bergantung kepada kekuatan fizikal pelajar yang berbeza-beza. Kesannya, kualiti acuan pasir sering kali tidak seragam.

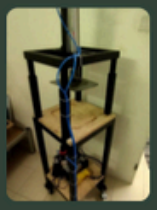
OBJEKTIF

i) Merekabentuk dan membangunkan mesin ramming foundri menggunakan sistem pneumatik.
ii) Menguji keberkesanan mampatan terhadap masa.
iii) Menilai maklumbalas daripada pelajar dan pensyarah.

METODOLOGI

Proses pembangunan inovasi ini merangkumi beberapa fasa dan kaedah seperti berikut:

- Fasa 1: Analisis Keperluan – Pemerhatian, temu bual dan kajian literatur.
- Fasa 2: Reka Bentuk & Pembangunan – Cipta prototaip mesin ramming dengan sistem pneumatik.
- Fasa 3: Ujian & Penilaian – Uji prototaip bersama pelajar dan pensyarah, serta analisis soal selidik.



HASIL DAPATAN

Jadual masa yang diambil semasa pemadatan pasir menggunakan kaedah manual

Lapisan pemadatan pasir	Tekanan padatan pasir (MPa)	Masa yang diambil (s)
1	0.38	130
2	0.38	220
3	0.38	220

Jadual masa yang diambil semasa pemadatan pasir menggunakan mesin ramming pneumatik

Lapisan pemadatan pasir	Tekanan padatan pasir (MPa)	Masa yang diambil (s)
1	0.38	215
2	0.38	169
3	0.38	154

PERBINCANGAN

- Prototaip mesin ramming berfungsi dengan baik menggunakan sistem pneumatik bagi memadatkan pasir secara konsisten.
- Soal selidik menunjukkan 85% pelajar lebih memahami konsep tekanan dan kawalan pneumatik melalui penggunaan mesin ini.
- Tenaga pengajar menyatakan bahawa alat ini menjadikan sesi PdP lebih interaktif dan menyeronokkan.
- Penggunaan mesin ini menjimatkan masa dan mengurangkan keletihan berbanding kaedah manual.

KESIMPULAN

Inovasi ini bukan sahaja berjaya meningkatkan kecekapan pemadatan pasir, malah berpotensi untuk diterapkan secara lebih meluas dalam pendidikan teknikal sebagai alat bantu mengajar yang praktikal dan relevan dengan keperluan industri semasa.

SUMBANGAN KEPADA MASYARAKAT

- Menyokong pendidikan TVET dengan menyediakan alat bantu PdP berasaskan teknologi industri sebenar.
- Memberi pendedahan awal kepada pelajar tentang sistem automasi dalam bidang foundri.
- Berpotensi dikembangkan ke institusi pendidikan lain sebagai alat pembelajaran standard dalam kursus foundri dan pneumatik.

EDUCATION

POSTER
INNOVATION

SCIENCE & TECHNOLOGY

POSTER ID: IS001

POFA-PET INCORPORATED CONCRETE (WPIC) FOR GAMMA RAY SHIELDING

Nurain Najwa and Siti Amira Othman,
Universiti Tun Hussein Onn Malaysia

INTRODUCTION

Gamma-ray shielding research is critical in industries ranging from medical radiography to nuclear power, where high-energy gamma radiation poses serious health concerns and practical obstacles

PROBLEM STATEMENT

The global environmental crises have been brought on by these non-biodegradable waste items and population expansion. Many of them are illegally dumped in dustbins or crammed into the landfill

OBJECTIVES

i. To study the physical properties of POFA-PET as a radiation-shielding material.
ii. To assess the durability and mechanical strength of the POFA-PET mixer while preserving sufficient radiation shielding.
iii. To evaluate the effectiveness of the POFA-PET incorporated concrete mixer as a shielding material via radiation shielding calculations

MARKET OPPORTUNITY

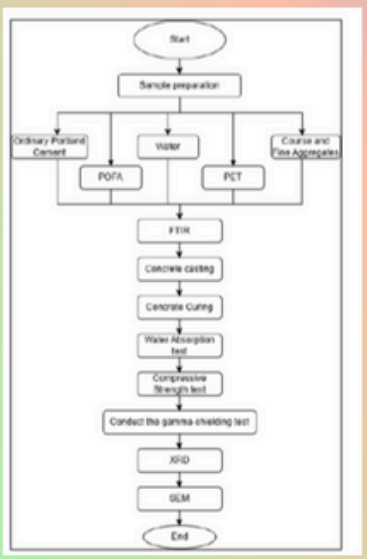
ADAPTABLE FOR SPECIALIZED INDUSTRIES

- Can be tailored for specific needs, including lightweight or high-strength versions for different applications, increasing its versatility.

GLOBAL MARKET RELEVANCE

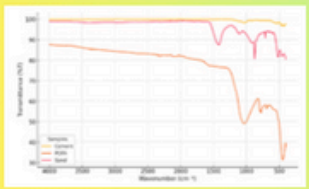
- The increasing focus on sustainability worldwide positions this material as a competitive solution for industries in need of effective, eco-friendly radiation shielding and durable construction materials.

METHODOLOGY



SAMPLES

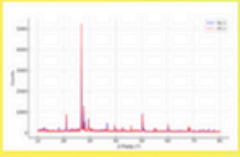
RESULTS



FTIR

Linear Attenuation Coefficient

Distance Dependent



XRD

Thickness Dependent

Time Dependent

SCIENCE & TECHNOLOGY

POSTER ID: IS003

UTHM
Universiti Tun Hussein Onn Malaysia

KEMENTERIAN PENDIDIKAN TINGGI

NEWTON'S LAW (NEWTON THIRD'S LAW)

INTRODUCTION?

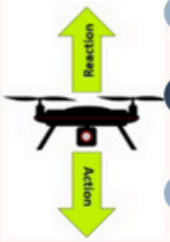
His third law states that for every action (force) in nature there is an equal and opposite reaction. If object A exerts a force on object B, object B also exerts an equal and opposite force on object A. This third law states that for every action (force) in nature there is an equal and opposite reaction. Newton's Third Law helps us understand the fundamental symmetry of forces in nature, where every interaction between objects is reciprocal

FIGURE OF INNOVATION?

- Simple prototype that shown newton's third law.
- The air in the balloon will push the car to moving the opposite direction of the air out.

F1 = F2

M1A1 = M2V2



- A balloon-powered car could evolve into an autonomous drone for delivery that can travel via both balloon propulsion and controlled aerial movement.
- The proposed system would enable a multi-modal transport system, utilizing balloon propulsion for initial launch and drone-style flight for longer distances or remote areas.
- The action of a drone's propellers, when spinning, pushes air downward, demonstrating Newton's third law. This equal and opposite reaction results in an upward force pushing the quadcopter, which, when it surpasses the gravity's pull, initiates upward movement.

INNOVATION OF THINGS

- Forces are pushes or pulls that cause an object to interact with another.
- Forces can be classified into contact forces (e.g., frictional forces) and non-contact forces (e.g., gravitational forces).
- The prototype movement, a resultant of this law, generates energy for movement, generating an action force and a reaction force.
- The prototype also stores potential energy due to gravity's pull, creating cumulative kinetic energy when moved.
- The level of movement speed is affected by air temperature, accumulated air, and the surface under force.

APPLICATION OF PHYSICS PRINCIPLE

MR ASHRAFF - - - - - MR AZHAD - - - - - MS ADRIEANA - - - - - MS ALIAH

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AUTOMATIC HOLE PUNCER AND STAPLER

INTRODUCTION

Boyle's law is a gas law that explains the relationship between the pressure and volume of gases. It states that if the temperature and amount of gas stay the same, pressure and volume are inversely proportional. This means as one goes up, the other goes down.

THE FORMULA FOR BOYLE'S LAW IS:

$P_1V_1 = P_2V_2$

This shows that when a gas's volume increases, its pressure decreases, and vice versa, as long as the temperature remains constant.

APPLICATIONS OF PHYSICS PRINCIPLE

☆ BOYLE'S LAW ($P_1V_1 = P_2V_2$)
- As gas volume increases, pressure decreases, and vice versa, if temperature stays constant.

☆ COMPRESSED AIR FOR OPERATION
- Controlled by Boyle's Law, compressed air moves a piston, activating the puncher or stapler.

☆ ELECTROPNEUMATIC SYSTEM
- Solenoid valve applies force to a cylinder connected to a conveyor belt.

☆ AUTOMATED PAPER RACK SYSTEM
- Sensors detect when paper is placed, triggering a motor to release it onto a roller, moving it to a conveyor.

☆ STAPLING MECHANISM
- A sensor detects paper on the conveyor, and the pneumatic cylinder staples through the paper, bending legs to secure it.

☆ SAFETY AND ERROR ALERTS
- Sensors and a buzzer activate if there's an error.
- Safety sensors stop operation if fingers are near the mechanisms.

INNOVATION OF THINGS

☆ DUAL FUNCTION
- Punches holes and staples in one automatic step.
- Options for "Punch Only," "Staple Only," or "Both."

☆ A4 PAPER COMPATIBLE
- Works with standard A4 paper.

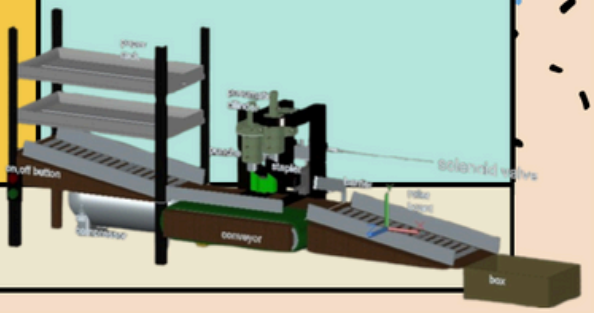
☆ ECO-FRIENDLY
- Collects paper punch-outs in a compartment for easy recycling.

☆ SMART CONNECTIVITY
- IoT-enabled for remote tracking and control in production lines.

☆ HIGH CAPACITY
- Fast, high-capacity model options for large document processing.

☆ CHILD SAFETY
- Auto-locks to prevent accidents.
- Easy to replace parts—no professional needed.

☆ ELECTROPNEUMATIC SYSTEM
- Uses air pressure for precision, speed, and durability.



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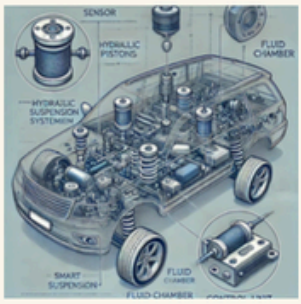
Smart Hydraulic Suspension System in Vehicles

1 Introduction

Suspension system in automobiles is creditworthy for driving safety and comfort for the suspension takes the vehicle sprung mass (body) weight and conveys all the forces which act in between automobile body and road surface.

4 Pascal's Law

In a confined fluid at rest, any change in pressure applied to the fluid is transmitted equally and undiminished in all all directions throughout the fluid.



2 Figure Innovation

5 Application of Physics Principle

Pascal's Principle: pressure exerted on a confined fluid is transferred undiminished in all directions, and this is how the hydraulic system operates.

Force and Motion: The system responds to the forces operating on each wheel by modifying the pistons' movement in response to sensor data.

3 Innovation of Things

According to Pascal's Law, a change in pressure at one location in a confined, incompressible fluid affects every other place in the fluid equally. Within this system:

Fluid Chambers and Hydraulic Pistons: attached to each wheel. Pressure is distributed throughout the system when a wheel hits a bump because the force is transmitted to the fluid.

Smart Suspension System: The hydraulic pressure is dynamically adjusted by sensors and control units to maximize handling and ride comfort.

Innovation in Active Suspension : This technique enables an active, adaptable approach, in contrast to traditional suspensions that employ passive springs and dampers.

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SPECIAL EDITION

PHYSICS FOR ENGINEERING TECHNOLOGY

PASCAL'S LAW

$P_1 + \frac{1}{2}\rho v_1^2 + \rho g h_1 = P_2 + \frac{1}{2}\rho v_2^2 + \rho g h_2$

HYDRAULIC SYSTEM

WHAT IS PASCAL'S LAW?

Pascal's Law is a fundamental principle in fluid mechanics, formulated by the French scientist Blaise Pascal in 1647. It states that when a pressure change is applied to an enclosed fluid, it is transmitted undiminished throughout the fluid in all directions.

The system we choose on Pascal's Law is Hydraulic System. The pressure exerted on a confined fluid is transmitted undiminished in all directions throughout the fluid. A hydraulic system is a mechanism that uses pressurized fluid to generate, control, and transmit power.

$P = \frac{F}{A}$

FORCE & AREA RELATIONSHIP

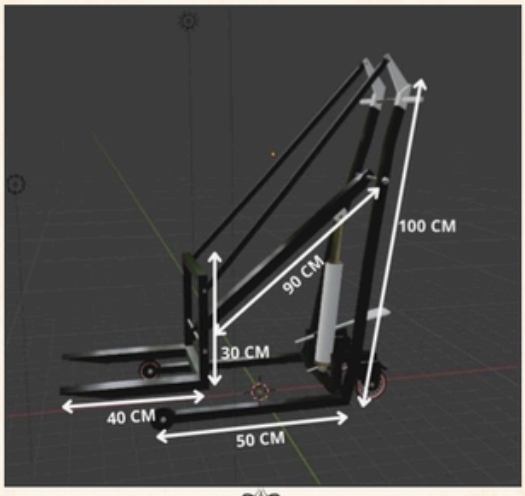
The force generated by the hydraulic pump is determined by the equation:

$F = P \times A$

Where:

- *F is the force exerted on the large piston (8 tons in your case),*
- *P is the pressure in the fluid,*
- *A is the area of the piston.*

FIGURE INNOVATION



APPLICATION OF PHYSICS PRINCIPLE

Pascal's Principle states that when pressure is applied to a confined fluid, the pressure is transmitted equally and undiminished in all directions. In the case of the hydraulic hand pump:

- *A small force applied on the hand pump's piston generates a pressure in the fluid (usually oil).*
- *This pressure is then transmitted equally through the fluid to a larger piston at the output end, which exerts a much larger force.*
- *This is how a relatively small input force (from the user) is transformed into a large output force (up to 8 tons in this case).*

INNOVATION OF THINGS

Architectural innovation is a type of product or service improvement that involves changing the architecture of a product to create new markets. It's also known as adjacent innovation

Materials used:

- *8 ton hydraulic hand pump – they use human power and mechanical advantage to move fluids or air from one place to another.*

- *Tyre – The tyre is designed to move the vehicle forward*

- *Stainless steel – Stainless steel is a durable, strong, and versatile metal it also corrosion resistance*

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