

الخطة البحثية لقسم التقنيات الميكانيكية للعام الدراسي 2019-2018 و2020-2019

ملخص عن النتائج	عنوان النتائج	العام الدراسي	جهة النشر	موقف النتائج	الشهادة	اللقب العلمي	اسماء الباحثين	ت
In this research, a comprehensive review of the methods of reducing the cell temperature and study of these methods in depth was focused on the type of fluid that cool the cell. The results obtained were focused on the economic feasibility of the financial costs and their consumption of electricity. The aim of the study is to find out all the good ways to reduce the temperature of the cell and its benefits and the difference between each way and the advantages and disadvantages of each method. This paper has revealed that it also focused on determining which technologies are appropriate and easy to use and give good results. The study recommends the need for independent research on the economic feasibility of cells for cooling photovoltaic cells.	1- MULTIPLE MODERN METHODS FOR IMPROVING PHOTOVOLTAIC CELL EFFICIENCY BY COOLING: AREVIEW	-2018 2019	Journal of Mechanical Engineering Research and Developments (JMERC)	منشور (4)42 (2019) 78-71			Ahmed Mohsin Alsayah	-1
							Mahdi Hatf Kadhun	
					دكتوراه	استاذ مساعد	Mahir H. Majeed	
							Amjed Abdulalah Al-Najafy	
In this research paper, full details were presented to analyze and optimize the behavior and performance of the blade of the small horizontal axis wind turbine (less than 1 KW). QBlade software was used to simulate the wind turbine blade during the working conditions. The mathematical formulations which used in QBlade software were based on the Blade Element Momentum method (BEM). It was studied deeply the effect of design parameters (Twist Angle and Chord length) on the behavior and performance of the wind turbine. It was used SG6043 airfoil for 10 different sections of 1.17 m blade length. The obtained results were of high accuracy, and it was proved that the QBlade software is reliable to analyze the blades of wind turbine. The paper exhibits the necessary steps to build and optimize the blade of wind turbine, in addition to the features and advantages of the software.	2-Analysis of Wind Turbine Using QBlade Software	-2018 2019	IOP Conference Series: Materials Science and Engineering	منشور 518 (2019)			Mustafa Alaskari	-2
							Oday Abdullah	
					دكتوراه	استاذ مساعد	Mahir H. Majeed	

<p>In this research paper, MATLAB program was built based on the analytical solutions which used to determine the distribution and amount of the total heat generation at the interface between the contacting parts of the friction clutch. Furthermore, the amount and distribution of the frictional heat generation on the contact area of each element of the friction clutch system (flywheel, clutch disc, and pressure plate) during the sliding stage was calculated. Finally, the program was introduced using MATLAB GUI (graphical user interfaces) to analyze the heat generated on the friction clutch surfaces. Different types of materials (thermal properties), sliding time, torque function and angular sliding speed function can be applied into the software to find the solution for a specific case of a single-plate friction clutch</p>	<p>3-The distribution of frictional heat generated between the contacting surfaces of the friction clutch system</p>	<p>-2018 2019</p>	<p>International Journal on Interactive Design and Manufacturing (IJIDeM) volume</p>	<p>منشور 13, pages 487-498 (2019)</p>			Oday I. Abdullah	<p>-3</p>
							Josef Schlattmann	
					دكتوراه	استاذ مساعد	Mahir H. Majeed	
							Laith A. Sabri	
<p>The study was conducted using numerical simulation software (ANSYS- cfx) to select the best model for its manufacture. The simulation results showed that the air guides model is the best, directing the largest amount of air to the base of the cell and the lowest cost and available in local markets. Air guides shall be installed inside an aluminum channel fixed to the bottom of the cell base and the channel dimensions shall be selected according to the dimensions of the photovoltaic cell to be cooled. A numerical study determine the best number and best location of the air guides inside the duct channel and the tilt angle of air guides and showed that the optimum number of pneumatic guides is (18) in a position (70 mm) from the base of the channel and at a 45-mile angle with the horizon</p>	<p>CFD study to improve PV cell performance by forced air : Modern design</p>	<p>-2019 2020</p>	<p>Periodicals of Engineering and Natural Sciences</p>	<p>منشور Vol. 7, No. 3, October 2019</p>			Ahmed Mohsin Alsayah	<p>-4</p>
							Mahdi Hatf Kadhum Aboaltabooq	
					دكتوراه	استاذ مساعد	Mahir H. Majeed	
							Bassam Abed Saheb	

<p>Numerous methods, algorithms and mathematical models were proposed and used in the literature for solving the CF problem. The current paper used a heuristic method based on the hamming distance to form MCs & PFs, this proposed method calculates the hamming distance for the parts, firstly then rearranges them based on the results to shape the PFs. Afterward, the hamming distance was calculated for machines, then the machines rearranged based on the results to form the MCs. Three datasets from the literature were utilized to validate the proposed method. Five performance measures were used for comparison and evaluation, these measures are Exceptional Elements EE, Percent of Exceptional elements PE, Voids, Grouping Efficiency GE and Machine Utilization MU. The results referred to the outperforms of the hamming distance based method comparing with the best known results in the literature. Among the total 20 performance indexes: three are better than, twelve are equal to and five are almost equivalent to the best known results. On the other hand, the proposed hamming distance based method is effectual particularly in terms of the number of machine cells and PE</p>	<p>HEURISTIC METHOD FOR SOLVING CELL FORMATION PROBLEM IN CELLULAR MANUFACTURING SYSTEM BASED ON HAMMING DISTANCE</p>	<p>-2018 2019</p>	<p>The Iraqi Journal For Mechanical And Material Engineering</p>	<p>منشور Vol.19, No1,Mar ch 2019</p>	<p>دكتوراه ماجستير</p>	<p>استاذ مساعد مدرس مساعد</p>	<p>Sanaa Ali Hamza Ammar Jihad</p>	<p>-5</p>
<p>The current paper used a strategy based on one well known method, namely Self Organization Map (SOM). It's used for the products firstly, then rearranged them to form the families. Afterward SOM used for the machines, then rearranged them as cells. The output of the proposed method was compared with the best mentioned results in the literature. Five performance measures were used for the comparison and evaluation, these measures are Percent of Exceptional PE elements, Voids V, Intercellular moves IC, Grouping Efficiency GE and Machine Utilization MU. The results referred to the outperforms of the SOM based method, where it leads to reduce the number of IC moves. The PE values are equal or almost equivalent to the best known results, the MU results are approximately equivalent to the best recognized results and the GE results are better than the best identified results for the most problems</p>	<p>Self Organization Map Applied for the Design of Cell Formation in a Cellular Manufacturing System</p>	<p>-2018 2019</p>	<p>Journal University of Kerbala</p>	<p>منشور Vol.17, No2, 2019</p>	<p>ماجستير دكتوراه</p>	<p>مدرس مساعد استاذ مساعد</p>	<p>Ammar Jihad Sanaa Ali Hamza</p>	<p>-6</p>

<p>The main purpose of this paper is modified the strength and fatigue characterizations of natural rubber materials by reinforcement with Nano particle materials. Where the Nano particle used is carbon Nanoparticle tube with various volume fractions, as (0.2% to 1%). Therefore, the strength on rubber materials, with various Nanoparticle volume fractions, is evaluated by using experimental technique by testing the tensile sample with universal test machine. After this, evaluate the fatigue characterizations of rubber materials, with various Nano particle volume fractions, by two techniques, first, experimental technique with manufacturing the fatigue test sample and then using rubber fatigue machine to testing its samples to evaluating the fatigue strength and life, and second, numerical technique by using finite element method with using Ansys program technique. Where, the experimental results of fatigue characterization are comparison with numerical fatigue results to shows the agreement between experimental and numerical technique. Therefore, its comparison shows the good agreement of fatigue results with maximum error between the two techniques use is about (10.28%). Finally, the results for strength and fatigue are shown that the strength and fatigue characterization are modifying with reinforcement by Nano particle carbon materials. Then, the increasing of Nano particle is lead to increase the strength and fatigue characterizations of natural rubber materials.</p>	<p>modifying of fatigue characterization for natural rubber materials by carbon nano-particle tube (CNT) reienforcement</p>	<p>-2018 2019</p>	<p>INTERNATIONAL JOURNAL OF ENERGY AND ENVIRONMENT</p>	<p>منشور Volume 9, Issue 3, 2018</p>	<p>ماجستير</p>	<p>مدرس</p>	<p>Ali Hammoudi Al-Wazir</p>	<p>-7</p>
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This paper deals with synthesizing of nanocomposites of unsaturated polyester (UP) filled with nano silica and investigation the effect of silica content on the tribological behavior of UP and nanocomposites . Silica nanoparticles were prepared by burning rice husk ash (RHA) as an agricultural waste material. Three different percentages as 2%, 6% and 10% of nano silica were added to the unsaturated polyester and dispersed by using ultrasonic waves method. As a result of agglomeration and sedimentation of nano RHA particles, dispersing by ultrasonic waves was very effective to terminate these challenges. X-Rays diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR) and scanning electron microscopy (SEM) technics were used for characterization of materials. RHA-UP nanocomposites were tested for their tribo-performance by pin-on-disc machine. XRD demonstrated that white rice husk ash consists of amorphous silica. SEM demonstrated that silica particles were distributed uniformly and well embedded within the polyester matrix. Results showed an improvement in wear resistance with relatively stable friction coefficient with the addition of 10% nano silica. Adding 2 wt% nano RHA negatively affected the wear resistance of RHA-UP nanocomposite .The best tribological performance of 10% RHA-UP nanocomposites achieved at load 10N. Incorporation of RHA with unsaturated polyester has advantages of reducing pollution, making the pollutant RHA as a valuable material to produce low cost and lightweight products with modified properties. Silica enriched RHA could prove to be cheaper anti-wear additives for producing high performance unsaturated polyester composites such as brake pads.

RICE HUSK ASH AS A NANO-FILLER TO SYNTHESIZE THERMOSETTING POLYMER NANOCOMPOSITES AND EVALUATION OF ITS TRIBOLOGICAL BEHAVIOR

-2018
2019

مجلة الكوفة
الهندسية

منشور

ماجستير
هندسة
مواد

مدرس

سلسبيل كريم برهان

ماجستير
هندسة
مواد

مدرس

ميثاق محسن عبد

دكتوراه
هندسة
مدنية

مدرس

مصلح عامر صالح

<p>The objective of this study is to determine the effect of the time reach to the steady state when changing the length of the sample exposed to constant thermal load and materials, depending on the distance from the hot face of all lengths at a number of points (3, 6, 9 and 12) cm. From the results of the time obtained numerically from the ANSYS-14 program, the time to reach the steady state was determined when the difference between the sample temperature reached with the previous grade of 0.001. The results indicated that the time required to reach the steady state (S.S.t) increases by increasing the length of the sample in the selected points when constant thermal diffusivity (α), where the time needed to reach the steady state of the copper material ranged between (879-1085) seconds at a length of 15 cm and (2112-3005) seconds at length 30 cm and (2871-4937) seconds at a length of 45 cm as well as the results showed that the time required to reach the steady state increased with the thermal diffusivity decrease where the time required to reach the steady state of the copper of the highest thermal diffusivity ranged between (879-4937) seconds for all lengths while the time required to reach the steady state of the material of the lowest thermal diffusivity (hardboard) is between (168400-1078000) seconds.</p>	<p>Effect of Sample Length on the Time Needed to Reach the Steady State Case</p>	<p>-2018 2019</p>	<p>Journal of University of Babylon for Engineering Sciences</p>	<p>منشور في المجلد 27 العدد 2 سنة 2019</p>	<p>ماجستير هندسة ميكانيك</p>	<p>مدرس</p>	<p>Mohsin Obaid Muhi</p>	<p>-9</p>
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<p>The aim of this study is to know the thermal initiation time of samples of different lengths, and materials with different thermal properties at a number of points along the samples at the beginning , the middle and the end as a first study .The second study focused on the adoption of a fixed distance(x) from the hot face for all lengths of samples at a number of points with $x = (1, 3, 6 \text{ and } 9)\text{cm}$. The results of the first study showed that the thermal initiation time of samples increases with the increase of distance from the hot face and the relationship between them was an exponential positive relationship when fixed the thermal diffusivity. The study also showed that the relationship between the thermal initiation time of samples and the thermal diffusivity was an exponential inverse relationship when the distance from the hot face was fixed. The thermal initiation time of the chromium material with the highest diffusivity at $26\text{ }^{\circ}\text{C}$ ranged from (0.0465 - 207.28) seconds and the low-diffusivity cellular glass material ranged between (3.348 - 21762) seconds to the nearest and farthest point from the hot face. The result of the second study showed that the length of the sample has no effect on the thermal initiation time of sample at the equivalent points located on a fixed distance from the hot face</p>	<p>Effect of Sample Length on the Time Needed to Reach the Steady State Case</p>	<p>-2018 2019</p>	<p>Journal of University of Babylon for Engineering Sciences</p>	<p>منشور في المجلد 26 العدد 8 سنة 2018</p>	<p>ماجستير هندسة ميكانيك</p>	<p>مدرس</p>	<p>Mohsin Obaid Muhi</p>	<p>-10</p>
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<p>تعرضت هذا البحث لدراسة تأثير الفرق بين درجتي حرارة نهايتي جسم معرض لإجهاد حراري في الحالة غير المستقرة على زمن بدأ التحسس الحراري وعلى ابعاد مختلفة من الوجه الساخن. نتائج هذه الدراسة انها أوضحت التأثير العكسي للفرق بين درجتي حرارة نهايتي الجسم المعرض لانتقال الحرارة غير المستقر على زمن بدأ التحسس الحراري.</p>	<p>Temperature Difference Effect between Two Samples Ends on the Inception of Thermal Sensitivity</p>	<p>-2018 2019</p>	<p>Journal of University of Babylon for Engineering Sciences</p>	<p>منشور في المجلد 27 العدد 2 سنة 2019</p>	<p>ماجستير أ. مساعد</p>	<p>رضا حميد مجيد</p>	<p>-11</p>	
<p>يهدف العمل لدراسة إمكانية تحسين الخواص الميكانيكية لعينات الملاط باستخدام ألياف البولي بروبيلين المتاحة والرخيصة بمساعدة تقنية المعالجة بالميكروويف. تم معالجة المكعبات المنتجة من الملاط الذي تحتوي على نسب وأطوال مختلفة من ألياف البولي بروبيلين بواسطة المايكروويف لأوقات مختلفة. أظهرت النتائج انخفاضاً هامشياً في قوة الضغط مقابل زيادة قوة الشد المباشرة مع زيادة محتوى الألياف.</p>	<p>Investigating the effect of polypropylene fiber on mortar mechanical properties with the aid of microwave curing</p>	<p>-2019 2020</p>	<p>IOP Conference Series: Materials Science and Engineering 3rd International Conference on Engineering Sciences Kerbala, Iraq</p>	<p>منشور في المجلد 15 سنة 2020</p>	<p>ماجستير ماجستير ماجستير دكتوراه</p>	<p>مدرس مساعد مدرس مساعد أ. مساعد مدرس</p>	<p>سارة علاء عبد الأمير محمد رياض محمد علي رضا حميد مجيد وجدي شبر اليحيى</p>	<p>-12</p>

<p>تمحور البحث حول تأثير المعالجة بواسطة كل من درجة الحرارة والميكروويف لفترات زمنية متعددة على خواص الملاط. أظهرت نتائج الاختبار أن معالجة الميكروويف تميل إلى زيادة كبيرة في معدل ترطيب الأسمنت (منتجات ترطيب أعلى) في جميع الفترات التي تم فحصها. مع أوقات المايكروويف الطويلة، تم الحصول على نقاط قوة أعلى، حيث بلغت النسب المئوية للزيادة 54.3% و 33.2% من 12 دقيقة لمعالجة الميكروويف في 3 و 7 أيام على التوالي. أكدت البيانات أيضاً أن تطبيق درجة الحرارة بعد معالجة المياه حقق تطوراً أعلى في قوة الضغط عند مقارنته بالملاط الذي تم معالجته بالماء فقط. على سبيل المثال، عينات المونة التي تعرضت لدرجة حرارة 275 درجة مئوية لمدة 3 ساعات أنتجت نقاط قوة أعلى، حيث بلغت نسب الزيادات 55.7% و 45.4% في 3 و 7 أيام على التوالي. في المقابل، أنتجت كل من أنظمة علاج الملاط مع انخفاض الكثافة.</p>	<p>UNCOVERING THE ROLE OF TEMPERATURE TREATMENT OR MICROWAVE ON THE PROPERTIES OF MORTARS CURED BY WATER</p>	<p>-2019 2020</p>	<p>Journal of Engineering Science and Technology</p>	<p>منشور في المجلد 15 العدد 1 سنة 2020</p>	<p>دكتوراه ماجستير أ. مساعد ماجستير</p>	<p>مدرس مدرس</p>	<p>وجدي شبر اليحيى رضا حميد مجيد ليث رضا محمد</p>	<p>-13</p>
<p>Previous research on the development of normal air cooler has been conducted into a proposed four-door air cooler. The results indicated that the effectiveness of the proposed air cooler (75.4% - 30.3%) was higher than the effectiveness of the normal air cooler (70.4% - 15.2%) at temperatures of (42°C - 33°C) but the effectiveness of both air coolers corresponded to the high temperature (42°C - 43°C). As well as the relative humidity of the air coming out of the proposed air cooler was higher than the normal air cooler at times of high temperature degrees (42°C - 33°C). However, the case is reversed at times of temperature degrees higher than (42°C). This means that the relative humidity of the air coming out of the proposed air cooler was lower. Therefore, it was necessary to study the effect of water flow on the cooling effectiveness in the proposed</p>	<p>Study the Effect of Water Flow on Cooling Effectiveness of a Proposed Four-Door Air Cooler</p>	<p>-2018 2019</p>	<p>Journal of University of Babylon for Engineering Sciences</p>	<p>منشور Vol. 26 No. 8 ((2018</p>	<p>ماجستير</p>	<p>مدرس مساعد</p>	<p>Munadhil A. H. Aldamaad</p>	<p>-14</p>

air cooler.								
<p>The cell formation (CF) problem is considered the most essential issue in cellular manufacturing systems (CMS). CF deals with the arrangement of similar parts into groups known as part families (PFs) and organizes machines also into groups, called machine cells (MCs). In the literature, numerous methods, models and algorithms have been proposed and developed to handle CF problems. However, very few studies have dealt with the assessment and comparison of these methods, to identify the most effective. This has provided strong motivation for the study presented here. The present paper focuses on two methods that are used infrequently to form MCs and PFs, and applies them in three strategies: the first is based on the use of a hamming distance only, while the second uses only a self-organization map (SOM). However, the third method applies a hybrid approach based on SOM and hamming distance. The outputs of the selected methods were compared, to select the best one. A set of five benchmark datasets and three performance measures was used for comparison and evaluation. These performance measures are: percent of the exceptional elements (PE), grouping efficiency (GE), and machine utilization (MU). The results refer to the outperforms of the hamming distance in terms of PE, GE and MU for most of the selected benchmark problems.</p>	<p>Assessment of Hamming Distance and Self Organization Map in Solving Cell Formation Problem</p>	<p>-2019 2020</p>	<p>IOP Conf. Series: Materials Science and Engineering 671 (2020) 012025</p>		<p>دكتوراه ماجستير</p>	<p>استاذ مساعد مدرس مساعد</p>	<p>Sanaa Ali Hamza Ammar Jihad</p>	<p>15</p>

<p>In the present work, sheets of high-density polyethylene, reinforced with strips of polypropylene using a friction stir welding technique were executed. Welding was carried out using a friction stir welding tool of 20 mm shoulder diameter and 5 mm for both pin diameter and pin length with zero tilt angle, the percentages of polypropylene added to the welding zone were 15, 20, 25, 30% (as a percentage of the added polypropylene to the welding zone), the recommended high tool rotation speed and low tool travel speed (520 rpm, 20 mm/min, respectively) were applied in all tests, the plunge depth was 0.5 mm (the penetration depth of tool shoulder from workpiece surface), dwell time at the event of submerging the pin into the faying surfaces and before initiating the tool travel speed was 45 seconds. Mechanical tests, represented by flexural and impact tests, exhibited an improvement in the mechanical properties of the welded specimens for the case of 25% added polypropylene. Friction stir welding has extraordinary potential to create imperfection- free joints and to initiate a high-quality weldment of high-density polyethylene sheets reinforced by polypropylene strips.</p>					دكتوراه	مدرس	Hazim H. Abdulkadhum
					دكتوراه	مدرس	Sajed Abdul-khider
					دكتوراه	استاذ مساعد	Sanaa Ali Hamza
	Mechanical behavior of friction stir welded high-density polyethylene sheets	-2019 2020	IOP Conf. Series: Materials Science and Engineering 671 (2020) 012030				

<p>During the engagement, the thermo-elastic behavior of the friction clutches over specific sliding periods was taken into consideration as an essential factor to obtain a successful design based on interactive approach for automotive engineers that voided premature failure. It is worth mentioning that the finite element technique was adopted in the current study to investigate and analyze the angular sliding speed influence on the generated heat due to friction among the elements of friction clutch at the initial period of engagement. The distributions of the heat generated during the complete sliding periods were achieved via coupling between the thermal and the elastic models analyses to obtain the solution that required by automotive designers. Results in the form of the distributions of generated heat due to friction, temperatures of surface, and contact pressure are presented for different values of sliding speed. Obviously, the results showed that the frictional heat generated was increased dramatically when the sliding speed increased too. Also, it was proved that the proposed interactive design approach succeeded to detect the status of the friction clutch system if it's stable or not.</p>	<p>Numerical analysis of thermal problem in dry friction clutches based on the interactive design approach</p>	<p>-2019 2020</p>	<p>International Journal on Interactive Design and Manufacturing (IJIDeM)</p>	<p>دكتوراه</p>	<p>استاذ مساعد</p>	<p>Mahir H. Majeed</p>
				<p>دبلوم عالي</p>	<p>مدرس مساعد</p>	<p>Dheyaa Eesa Kadhim</p>
				<p>دكتوراه</p>	<p>استاذ</p>	<p>Oday . Abdullah</p>
						<p>Josef Schlattmann</p>
<p>17</p>						

<p>Thermal action of materials is a vast topic, related to their thermal properties in general. Thermal effects can be used positively like all kind of thermometer relay, or annoyancly like distortions in shape and dimension because of heating and cooling. In this study, the variation effect of thermal conductivity on the temperature distribution was evaluated analytically. Solid and hollow cylinders are used as models to accomplish this study. The models assumed to be exposed to a uniform heat generation. Different types of materials (Copper, Aluminum, and Iron) have been used for each model. A comparison is made between the selected materials to show the thermal behavior under steady state condition. The selected range of temperature was very wide which begin from 0C° to the melting point of the selected materials. A new code was built to conduct the obtained analytical solution using MATLAB software. The results showed that the behavior of the temperature distribution for both cases (constant and variable thermal conductivity) is the same with a slight difference in the values of the obtained temperatures for both cases. The effect of thermal conductivity to the temperature distribution in the case of Iron material is much higher than the other selected materials due to the low thermal conductivity of Iron.</p>	<p>ANALYTICAL EVALUATION OF TEMPERATURE DEPENDENT THERMAL CONDUCTIVITY FOR SOLID AND HOLLOW CYLINDERS SUBJECTED TO A UNIFORM HEAT GENERATION</p>	<p>-2018 2019</p>	<p>Internationa l Journal of Mechanical Engineering and Technology (IJMET)</p>	<p>دبلوم عالي</p>	<p>مدرس مساعد</p>	<p>Dheyaa Eesa Kadhim</p>
						<p>Hussein K. Jobair</p>
				<p>دكتوراه</p>	<p>استاذ</p>	<p>Oday . Abdullah</p>
18						