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Abstract

Disaster management is a dynamic, sustained, and integrated process to improve the effectiveness and efficiency of activities related to the prevention, mitigation, preparedness, early warning, emergency response, rehabilitation, and reconstruction of the disaster. During the emergency phase, the transportation of humanitarian aids logistic must be properly managed in order to arrive on time

INTRODUCTION | JUNE 26 2018

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Spot welding of bimetallic white cast iron-nodular cast iron

[Wiwik Purwadi](#); [Beny Bandanadjaja](#); [Ari Siswanto](#); [Dewi Idamayanti](#)

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Implementation of modified P&O method as power optimizer of solar panel under partial shading condition for battery charging system

[Moh. Zaenal Efendi](#); [Suhariningsih](#); [Farid Dwi Murdianto](#); [Evi Inawati](#)

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The optimization of soft body armor materials made from carbon-aramid fiber using the Taguchi method

[Hari Purnomo](#); [Hardik Widananto](#); [Joko Sulistio](#)

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Ergonomic analysis on driver seat of electric car and its comparison with Lcgc car seat

[R. Rifano](#); [M. A. Ivananda](#); [R. Ismail](#); [H. Prastawa](#); [A. P. Bayuseno](#)

AIP Conference Proceedings 1977, 020004 (2018) doi: <https://doi.org/10.1063/1.5042860>

[Abstract](#) [View article](#) [PDF](#)

Study of fluids pressure in hydraulic press machine using L8 orthogonal array

[Joko Yuniarto Prihatin](#); [Heri Kustanto](#); [Slamet Pambudi](#); [Ignatius Henry Adi Nagoro](#)

AIP Conference Proceedings 1977, 020005 (2018) doi: <https://doi.org/10.1063/1.5042861>

[Abstract](#) [View article](#) [PDF](#)

Corrosion resistance improvement of aluminum under anodizing process

[Agung Setyo Darmawan](#); [Tri Widodo Besar Riyadi](#); [Abdul Hamid](#); [Bambang Waluyo Febriantoko](#); [Budi Satria Putra](#)

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Design of crack detection system for concrete built infrastructure based on fiber optic sensors

Fatimah Nur Hidayah; Wahyu Setia Budi; Kusworo Adi; Supardjo

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 PDF

Work environment engineering using HIRARC and 5S method

Buchari; Nazaruddin Matondang; Nurhayati Sembiring

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Abstract ▾

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Hot compressed water extraction of curcumin from *Curcuma domestica* Val

Mohamad Endy Yulianto; Vita Paramita; Indah Hartati; Dwi Handayani

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 PDF

Purification of red palm biodiesel by using K_2CO_3 based deep eutectic solvent (DES) with glycerol as hydrogen bond donor (HBD)

Renita Manurung; Aulia Arief; Gilang Ramadhan Hutaeruk

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Vitamin E extraction from red palm biodiesel by using K_2CO_3 based deep eutectic solvent with glycerol as hydrogen bond donor

Renita Manurung; Gilang Ramadhan Hutaeruk; Aulia Arief

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Preparation of supercritical fluid extraction using dry ice and exploration of equation of state to predict the operating conditions

[Endang Kwartiningsih](#); [Wahyudi Budi Sediawan](#); [Muslikhin Hidayat](#); [Ahmad Tawfiequrrahman Yuliansyah](#)

AIP Conference Proceedings 1977, 020012 (2018) doi: <https://doi.org/10.1063/1.5042868>

[Abstract](#) [View article](#) [PDF](#)

The effect of pre-strain on the strength of welded joint

[I. H. A. Nagoro](#); [J. Y. Prihatin](#); [B. R. Hilca](#); [Triyono](#)

AIP Conference Proceedings 1977, 020013 (2018) doi: <https://doi.org/10.1063/1.5042869>

[Abstract](#) [View article](#) [PDF](#)

Hazard identification, risk analysis and risk assessment on high-rise building construction project

[Anik Ratnaningsih](#); [Yeny Dhokhikah](#); [Anisa Fitria](#)

AIP Conference Proceedings 1977, 020014 (2018) doi: <https://doi.org/10.1063/1.5042870>

[Abstract](#) [View article](#) [PDF](#)

Satellite image catalog system improvement based on process innovation method

[Andie Setiyoko](#); [Ruci Meiyanti](#); [Nurbojatmiko](#); [Syamsudin](#); [Dana Indra Sensuse](#); [Handrie Noprisson](#)

AIP Conference Proceedings 1977, 020015 (2018) doi: <https://doi.org/10.1063/1.5042871>

[Abstract](#) [View article](#) [PDF](#)

Implementing fairtrade requirements for ensuring the supply chain sustainability: A case study of South Halmahera agricultural products

[Amalia Suzianti](#); [Hajid Naufal Atthousi](#); [Ian Berlian Pratama](#); [Zahrina Hasyati](#)

[Abstract](#) [View article](#) [PDF](#)

Design of transportation system of humanitarian aids logistic using variable neighborhood search (VNS) algorithm: Case study in Merapi eruption

Naniek Utami Handayani; Ary Arvianto; Yuanita Sesariana

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Application of geoelectric method for groundwater exploration from surface (A literature study)

Eva Rolia; Dwita Sutjiningsih

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Designing a chicken feed pellets machine using tapered roller wheel model

Syharuddin Rasyid; Muas Muchtar; Tri Agus Susanto

AIP Conference Proceedings 1977, 020019 (2018) doi: <https://doi.org/10.1063/1.5042875>

[Abstract](#) [View article](#) [PDF](#)

Predicting students' performance in English class

Nunik Purwaningsih; Diana Ross Arief

AIP Conference Proceedings 1977, 020020 (2018) doi: <https://doi.org/10.1063/1.5042876>

[Abstract](#) [View article](#) [PDF](#)

Alternative selection scenarios of oil and gas using fuzzy analytical hierarchy process (FAHP)

Dea Dana Lestari; Djoko Budiyanto Setyohadi; Suyoto

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Modelling the user interface design pattern for designing Islamic e-commerce website using user centered design

[David Mushthofa](#); [Mira Kania Sabariah](#); [Veronikha Effendy](#)

AIP Conference Proceedings 1977, 020022 (2018) doi: <https://doi.org/10.1063/1.5042878>

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The exploration through the factors affecting students' adoption on m-learning technologies

[Almed Hamzah](#); [Nurul Fatikah Muchlis](#)

AIP Conference Proceedings 1977, 020023 (2018) doi: <https://doi.org/10.1063/1.5042879>

[Abstract](#) [View article](#) [PDF](#)

Analysis of main cause factors and improvement recommendation of IT disaster recovery problems: A case study of XYZ organization

[Esa Pawenang Panjiwa Putra](#); [Bobby A. A. Nazief](#)

AIP Conference Proceedings 1977, 020024 (2018) doi: <https://doi.org/10.1063/1.5042880>

[Abstract](#) [View article](#) [PDF](#)

Analysis of the barriers of cleaner production implementation in Kampung Batik Semarang using interpretive structural modeling approach

[Darminto Pujotomo](#); [Sriyanto](#); [Lenny Widyawati](#)

AIP Conference Proceedings 1977, 020025 (2018) doi: <https://doi.org/10.1063/1.5042881>

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Design of Transportation System of Humanitarian Aids Logistic Using Variable Neighborhood Search (VNS) Algorithm: Case Study in Merapi Eruption

Naniek Utami Handayani^{1, a)}, Ary Arvianto¹, Yuanita Sesariana¹

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Abstract. Disaster management is a dynamic, sustained, and integrated process to improve the effectiveness and efficiency of activities related to the prevention, mitigation, preparedness, early warning, emergency response, rehabilitation, and reconstruction of the disaster. During the emergency phase, the transportation of humanitarian aids logistic must be properly managed in order to arrive on time and suit with the type and number of needs at each location of evacuation. During Merapi eruption in 2010, there were problems in the distribution of disaster logistic. They included the delay and the mismatch amount and types of relief goods at any location of evacuation. It is mainly due to the absence of transportation system planning to distribute disaster logistic owned by BPBD Sleman. The research aims to improve the system transportation of disaster logistics at the emergency response in order to minimize the unfulfilled demand and transport time using the algorithm Variable Neighborhood Search (VNS). The VNS algorithm is a meta-heuristic algorithm to solve combinatorial and global optimization. The basic idea of this algorithm is a systematic change of neighborhood with local search. The research resulted in four tours that optimally match the objective function with two trucks and two pick-ups.

INTRODUCTION

Disaster management is a dynamic, sustained, and integrated process in order to improve the effectiveness and efficiency of activities related to the prevention, mitigation, preparedness, early warning, emergency response, rehabilitation, and reconstruction of the disaster. Disaster is a term that refers to a physical disorder that affects the system as a whole and threatens the priorities and goals [1, 2]. Disasters can be divided into two general categories, i.e. natural disaster and disaster caused by human or technological error. Based on the cause, disasters can be divided into natural disasters and man-made disasters. Meanwhile, based on the speed of the occurrence time, disasters can be divided into sudden onset and slow onset [1, 2].

The impact of natural disasters is largely seen in the perspective of human life and their livelihood. The emergency response, recovery, and rehabilitation require enormous resources (e.g., disaster relief goods, funding, and personnel) that depend on the scale of damage and the type of disaster. Disaster response efforts are considered highly uncertain and complex, it must be managed properly in order to obtain faster responses. Thus, disaster management is very important, because it encourages the successful implementation of emergency response that begins with strategic planning of emergency response [2, 3].

Six approaches to disaster research include geographical, anthropological, sociological, developmental, medical and technical [4]. Disaster management is an activity designed to maintain and oversee the event of disasters and emergencies as well as to provide assistance in order to avoid or recover from the impact of a disaster [5]. In any type of disaster, the steps as disaster response are generally composed of 4 (four) phases [6], namely, mitigation, preparedness, response, and recovery. Characteristics of disaster management logistics are certainly different from the characteristics of commercial logistics in general, one of the characteristics is that the main purpose of disaster relief logistics activity is to alleviate the suffering of disaster victims [7].

Augmented Reality T-Shirt for Product Promotion

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Abstract. Augmented Reality (AR) has become an essential technology in various sectors. Nowadays, despite the popularity of AR for product promotion and media campaign, the use of printed media, such as books and cards, is still common. In fact, AR T-shirts is one of the innovations of clothing companies to promote their products. This paper was focused on the development of AR applications on T-Shirt that as a method to improve the product and to know the extent of how AR application can survive under various lighting conditions. The model used in developing the AR application was Waterfall Process Model. Lux meter was used to find out how far the camera can detect images on the T-shirt, in which it revealed that through the effect of light intensity, AR application on T-shirt could survive 10.8 lux or above. At light intensity of 10.8 lux, the camera experienced difficulty in tracking picture on the T-shirt. From the test using Lux meter, the result was that AR application could survive from twilight to sunlight. However, this study still requires further research such as the implementation of smartphones, media expert trials, and user testing to cooperate with related industries.

INTRODUCTION

The rapid technological developments and the interactive and exciting innovations have become inseparable elements of the 21st century. Augmented reality (AR) technology is one of the technologies that connect the real and virtual worlds in real-time [1]. With the implementation of AR, the interaction will become more real because the users can interact with virtual objects directly [2]. Currently, the use of AR has been applied into various fields. Some researchers confirmed this technology have been developed in the fields of education, military, medicine, industry, entertainment and marketing [3,4,5,6,7]. Business transformation and market competition growth become the opportunity in industrial realm to create an innovation that can attract people to know specific products or to build brand awareness of the products hence the public will recognize them. The use of proven technology can improve the productivity and create competitiveness of a company [8].

The use of AR as a media campaign and marketing is an appropriate step for the progress of business. Ilhan [1] mentioned that the use of AR for industrial marketing is essential and vital. Furthermore, Citigroup released a report that revealed the AR and VR markets can grow reaching up to \$ 2.16 trillion by 2035 in the industrial sectors. In this report, Citygroup also confirms the existence of AR as a disruptive innovation in the next 5-10 years. Currently, some AR products have been in marketing, including Orville Popcorn, ARM [9], Autodesk Showcase 2014, IKEA Catalogue, TryLive and The Artvertiser [10]. In Indonesia, AR has also been implemented in various companies as media campaign, for example, the emergence of Sosro Heritage [11], Gery AR, Taro Adventure, Super Keju Boboiboy Galaxy [12], and AR-Card Jogja Handicraft [4]—which uses AR to promote local products from Yogyakarta. However, the use of integrated AR in the clothing industry has not been popular yet.

The Influence of Container Material Conductivity to Sea Water Evaporation

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Abstract. Water has become a problem of great interest worldwide. Many researchers have done interesting work to convert sea water into fresh water by various methods, one of them with solar-still. Nevertheless, no studies have examined the effect of conductivity thermal of material on the evaporation of seawater in solar-still. Therefore, this study was conducted to determine the influence of conductivity on sea water evaporation. The study was conducted in Jakarta using sea water that is taken from offshore of Ujung Kulon, West Java, Indonesia. Materials used in this research were rubber, plastic, stainless steel, and copper. The tested material was used as a container to accommodate sea water to be evaporated. The research was conducted concurrently so that environmental and weather effects could be ignored. The result showed that the temperature of material fell into ambient temperature and did not store heat. The evaporation efficiency with different container material (rubber 3.73%, plastic 3.82%, Stainless steel 4.58%, and copper 4.75%) had risen along with the increase of the conductivity. Thus, it could be concluded that the conductivity of the container material influences the rate of sea water evaporation.

INTRODUCTION

Water is the decisive material in life. Humans, plants, and most animals will not survive without water. Along with the growing population of people living in this earth, water consumption is increasing. The addition of human population as much as 15% will reduce the water source and increase the water shortage by 40% [1], while there is only 2.8% amount of fresh water on the surface of the earth, and the rest is sea water [2]. Thus, sea water is a potential source of fresh water.

Because of its enormous potential, various methods and research have been done to convert sea water into fresh water. Distillation is one of the most widely used methods. Evaporation processes that occur slowly make the contaminants left behind so that the resulting water becomes pure. The distillation process becomes cheaper when done by utilizing solar energy, although the production is not high. The direct heating method with solar heat is the most suitable way to produce fresh water up to 200 m³/day [3].

The process of distillation by solar heating is generally done by using solar still. Various methods and materials are used to improve the performance of solar still. designed and constructed three solar still that uses packed layer, rotating shaft and conventional one [4]. The packed layer is composed of glass balls on the surface of bottom of still basin. The result shows that the productivity of the packed layer still basin was higher than the other two since the material of the packed layer has higher thermal properties. The use of Portland cement blackened, as heat storage, increases freshwater production by 39% [5]. Hanen Ben Halima, Nader Frikha and Slimane Gabsi use air bubbles to improve evaporation [6]. Concave-shaped solar stills are used to increase evaporation by A. E. Kabeel [7]. The tilted-wick was placed on the surface of the solar still spreading water to the entire surface of the wick through capillary fibers. Therefore, the temperature becomes higher in the thin layer [8]. The perforated aluminum is

Mechanical and Physical Properties Improvement of S275J2 Welded Carbon Steel

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Abstract. In the present research, the effects of post weld heat treatment on the mechanical and physical properties of S275J2 welded Carbon steel by Shielded Metal Arc Welding are analyzed. The material is commonly used in metal construction, base plate of wellhead, metal composite and concrete. The micro structure testing, Charpy-V-Notch Impact testing, and hardness testing were done focusing on specific regions, namely base metal, heat affected zone, and weld metal. The result of hardness test showed that there is a decrease of hardness value after post weld heat treatment. Meanwhile, the result of impact test showed that impact energy for metal base, heat affected zone and weld metal of welded material without any post weld heat treatment are lower than those with post weld heat treatment. Moreover, the results of microstructure test showed that the grain size of welded material without post weld heat treatment is finer than welded material with post weld heat treatment. Meanwhile, welded material with and without post weld heat treatment has the same microstructure but the grain pattern of the structure on welded material with post weld heat treatment process is more uniform and evenly distributed in compared to those of welded material without post weld heat treatment.

INTRODUCTION

Carbon steel S275J2 are commonly used in metal construction, base plate of wellhead, metal composite and concrete. Therefore, welding process becomes an important process in these applications. Melting and subsequent cooling process are some steps in welding process. However, these steps may result in the presence of residual stress and microstructure change in weld metal, heat affected zone (HAZ) and base metal [1].

A residual stress is a macroscopic stress formed inside the metal during non-uniform plastic deformation, as in cold or thermal gradients, in quenching and in welding process. The welding process will also change the microstructure of the metal.

Moreover, residual stresses are also primarily formed as the result of contractions that occur as the weld metal solidifies and cools to ambient temperature and will have a significant effect on corrosion, fracture resistance, creep and corrosion fatigue performance—in which this phenomenon is desirable [2]. Residual stress is inevitable on welded joints, while the Post Weld Heat Treatment (PWHT) is an effective way to reduce it [3-5].

Basically, PWHT can have deleterious effects on certain mechanical properties, especially toughness. Therefore, the determination of the parameters for particular purposes that can resolve the problem and to improve the quality of welding is very important [6-10].

High quality material and joint (e.g., welding) are generally used in the oil and gas industry and construction applications. In these applications, defect and poor quality weld material will be risky. The intermediate or final products such as pipe joint, flange and weld joint, which experience surface and internal defects, will deteriorate the final products' quality. The elimination of such issues, especially of the internal defects, becomes crucial for every