VOL. 15, NO. 7, APRIL 2020 ISSN 1819-6608
ARPN Journal of Engineering and Applied Sciences

www.arpnjournals.com

COMPARATION BETWEEN SUSPENDED OR SEABED PIPELINE INSTALATION FOR INTER ISLAND FRESH WATER SYSTEM

Tri Suyono[1,2], Agustinus Purna Irawan[2], Wati Asriningsih Pranoto[2] and Ahmad Fudholi[3]
[1]Faculty of Engineering, Universitas Khairun, Ternate, Indonesia
[2]Faculty of Engineering, Universitas Tarumanagara, Indonesia
[3]Solar Energy Research Institute, Universiti Kebangsaan Malaysia, Bangi Selangor, Malaysia
E-Mail: tri.328172006@stu.untar.ac.id

ABSTRACT

Provision of drinking water in small islands that do not have the potential for fresh water needs to be done with several alternative technology applications. One of the technologies being carried out is by installing underwater drinking water pipes. Taking into account the operational technical factors, at sea depths above 30 m, several considerations need to be taken into account, given that installing pipes at these depths is difficult to control pipes manually, so additional equipment is needed for the safety of workers who will control the installed pipes, so this problem the best solution must be found. One problem that must be considered is the selection of pipe specifications that must meet technical requirements. Pipeline selection was carried out by conducting a study through the pipeline model and needs to be studied carefully and thoroughly so that the installed pipe is completely safe in the sea and does not suffer damage due to forces acting on the pipe caused by ocean currents, waves and underwater conditions others. The installation model that will be examined is the installation model suspended in the sea and installation on the sea floor. From the results of the analysis conducted on the pipe suspended in the sea with a depth of over 30 m and the installation of pipes on the seabed shows that the pipe installed in the sea is more stable both from the effects of waves and ocean currents with a smaller deformation value compared to the pipe that is installed suspended in in the sea. Pipe installed suspended in the sea with a span of 2,500 m and given a weight of 65 kg with a distance of 12 m can experience vertical deflection down to 2,775,326 mm. Pipes placed at the bottom of the sea are more stable because the flow of waves and waves is already small so that the pipes are more stable and do not oscillate. The recommended pipe installation is seabed with pipe specifications in accordance with the conditions of the Hiri Strait, namely HDPE pipes with a nominal pressure of at least 25 bar.

Keywords: pipeline, suspended, seabed.

INTRODUCTION

Underwater pipeline installation requires detailed analysis and must meet technical aspects. This sea pipe installation model will determine the stability of installed pipes, so it must be ensured that the installed pipes are completely safe from the influence of waves, ocean currents and also other factors such as ship and fishing activities [1]. In this study, it will be studied the comparison of underwater pipeline installation models with two alternatives, namely the Suspended system in the sea and the seabed. The study was conducted in the Hiri Strait precisely between Ternate Island and Hiri Island, North Maluku Province of Indonesia. The analysis to be carried out is a Hydrostatic analysis to find out the planned level of pipe stability.

Hiri Island, which is located on the north side of Ternate Island, is an island that does not have enough fresh water potential to meet the needs of the local community, so an alternative supply of drinking water is needed. The distance between the island of Hiri and Ternate Island is around 1.2 nautical miles or about 2.2 km with 185 m into the sea with uneven conditions on the seabed and is a rock and sea trench. The waves in this strait are also quite high and can even reach 5 m with strong currents between 0.5 - 2.8 m/s.

INSTALLATION ANALYSIS

In this study an analysis of two underwater pipeline installation models, namely the suspended pipe in the sea and the pipeline at the bottom of the sea [2], [3]. In the Suspended pipe will be examined several factors that affect the stability of the pipe [4]. Analyze were carried out on the effects of waves, ocean currents, ballast concrete, pipe contents and pipe weights. Analysis of pipelines designed at sea level includes hydrostatic, span analysis, longitudinal stress, hoop stress, pipeline protection and selection of pipe specifications [5], [6], [7], [8].

Analysis of pipe suspended

The effect of waves, ocean currents, ballast concrete, pipe contents and pipe weight is very large in the pipe installation system suspended in the sea. This needs to be studied to determine the stability of the pipe from the influence of buoyancy which results in deformation of the installed pipe. In Figure 1 and Figure 2 we can see the forces acting on the suspended pipe.

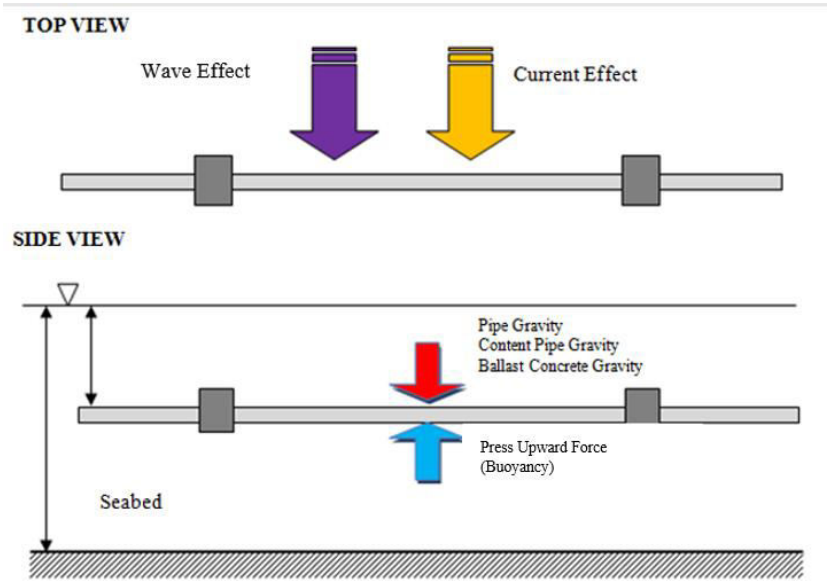


Figure-1. Forces on suspended pipe [1].

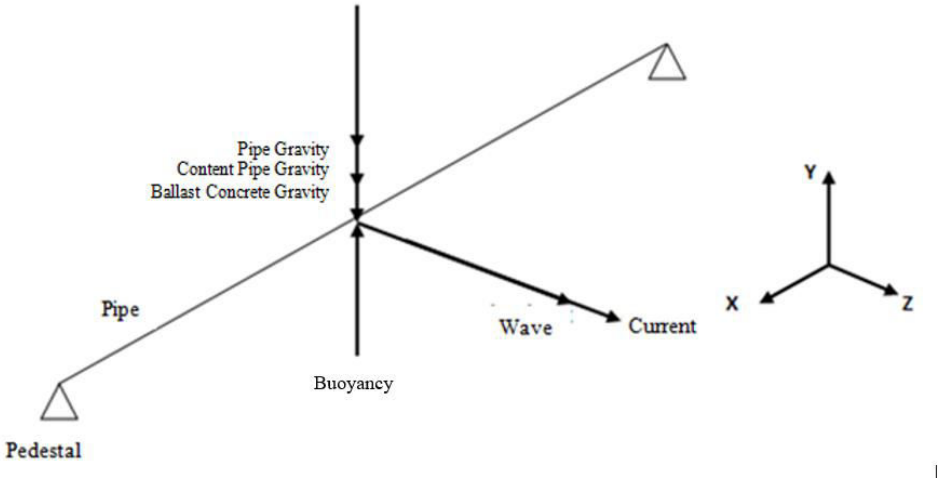


Figure-2. Isometric view of the forces on the underwater pipeline [1].

Analysis of pipe installed on sea

Pipes installed at the base will catch up with a number of conditions so that they need to be studied properly so that the installed construction will be strong and not prone to construction failure.

a. Hoop stress

The ability of the pipe to accept pressure at the depth of the deep sea. This analysis is needed to ensure that the pipe used is able to withstand pressure.

b. Longitudinal stress

An analysis to get the longitudinal stress that occurs in pipes due to bending, hoop stress, thermal stress and end cap stress.

c. Analysis of span

The shape of the seabed surface is not always evenly distributed, so there must be a part of the pipe that is not resting on the surface.

d. Hydrodynamic analysis

Is a pipe stress analysis due to the influence of the current speed? At sufficient depth, the wave effect is gone. One of the things that needs to be taken into account in the installation of pipes on the seabed is the ability of the pipe to withstand pressure. The deeper the sea, the greater the pressure. With the pressure of drinking water in the pipe, external pressure can be balanced. However, the pipe pressure must be taken into account when the pipe is empty.

e. Ability of pipe to accept hydrostatic pressure

Hydrostatic pressure is formulated by:

$$Ph = r\ g\ h \quad (1)$$

Where,

Ph = hydrostatic pressure
r = sea density (1,030 kg/m^3)
h = depth of sea.

Installation model

The analysis was carried out on two models of pipe installation, namely Suspended in the sea and on the seabed. In the Suspended model the pipeline is planned to be installed at a depth of 30 m, with the consideration that the pipe will be safe from the influence of normal boat traffic passing through the waters [9], [10]. Installation under the sea is carried out following the underwater contours with the deepest sea conditions 185 m. The pipe weights are made of reinforced concrete K 300 with a special mixture of cement in the building with a minimum weight of 65 kg with an installation distance of 12 m.

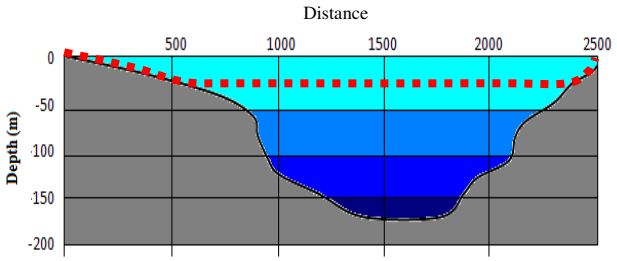


Figure-3. Suspended system pipeline installation plan.

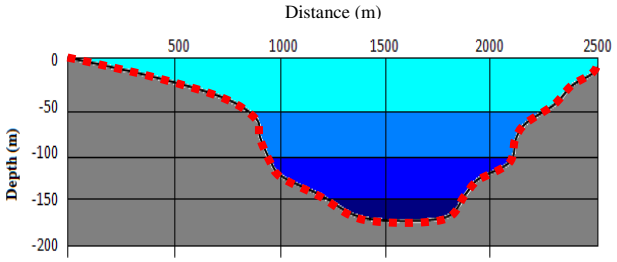


Figure-4. Seabed system pipeline installation plan.

RESULTS AND DISCUSSIONS

Analysis of pipe suspended in pipe

The ideal ballast will make the pipe always sink in an empty condition or filled with water. But this ballast must not be of great value [11]. Giving too much ballast will cause a very large pipe deflection [12]. From the analysis above it can be seen that the minimum weight of a concrete ballast installed every 12 m is 65 kg per piece. If the weight of the concrete used is less than that, the pipe will float when it is empty [13]. This floating pipe condition will be very dangerous because it will disrupt ship traffic in the Straits of Hiri. In addition, with a position close to sea level, the influence of waves and ocean currents will be very large and can cause the pipe to break. Adding an additional load of 65 kg every 12 m will cause the pipe to sink in an empty or filled condition. The results of the auto pipe analysis show the deflection of the pipe in the water due to the buoyancy force and the additional weight.

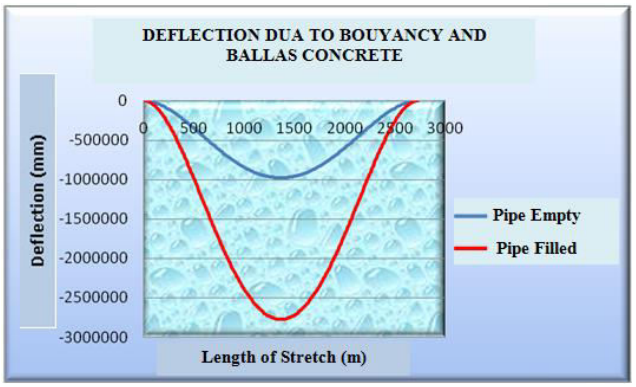


Figure-5. Seabed system pipeline installation plan.

The maximum deflection value right in the middle of the pipe is 971,719 mm in an empty condition and 2,775,326 mm in a condition filled with water in a vertical direction downward. Taking the assumption that the pipe will be hung at a depth of 30 m, the pipe deflection that occurs due to currents and waves as shown in Figure 6. It seems that the defect is very large. If the failure limits are included in the analysis, the pipe has failed. Because the voltage received exceeds the allowable limit.

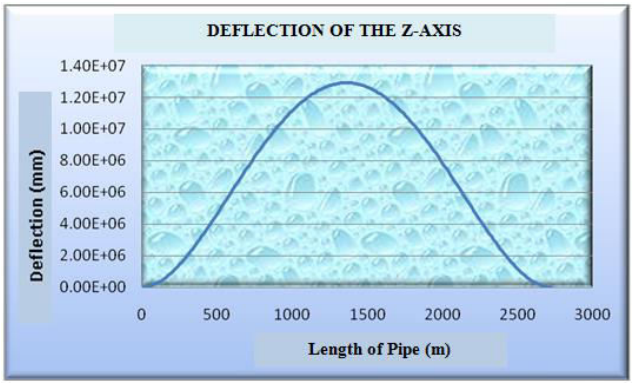


Figure-6. Horizontal deflection of the Z-Axis.

Analysis of pipe installed on sea

In general, the installation of underwater pipelines is to put pipes on the seabed. In a seabed environment with sufficient depth, the effect of waves and ocean currents is already so small that it does not affect the stability of the pipeline [14]. However, in-depth knowledge is needed about the underwater conditions themselves [15]. Sufficient studies are needed on underwater conditions, seabed species, soil, and also the marine environment. The stability of the pipeline at the sea level is designed by giving the weight of the pipe distance per 4 m with a weight of 85 kg, so that the pipe will be stable at the bottom of the sea, and basically the underwater pipeline should not be shifted or even oscillate after it is installed, because if this happens it will cause damage on the pipe. In the analysis of pipes placed at the bottom, the emphasis is on the analysis of the ability of

pipes to accept hydrostatic pressure, so that the selected pipe specifications are correct [16].

Equation (1) was used for calculate hydrostatic pressure. Then maximum depth of sea of pipe is 247.6719 m, as shown in Figure-7. Assuming that the pipe is always full of water, the depth of pipe installation with the above specifications must not exceed 247.6719 m. Based on this analysis, the pipe used for the installation of subsea pipelines in the Strait of Hiri is a minimum of 25 bar HDPE Nominal Pressure pipe which is able to accept a pressure of 25 bar or 2.5 MPa.

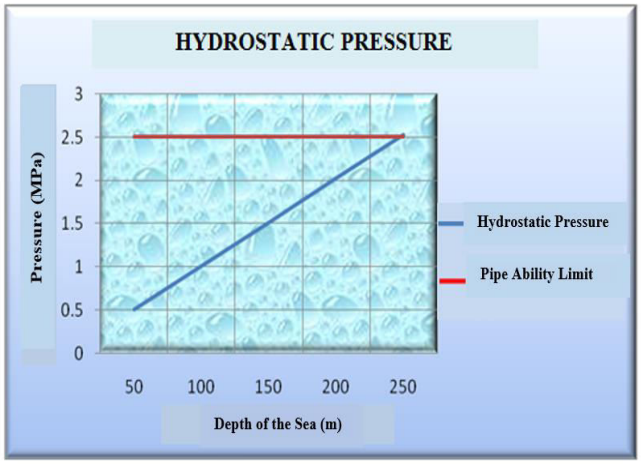


Figure-7. Pressure hydrostatic.

CONCLUSIONS

Installation of pipes in a suspended condition of 30 m has several advantages, namely the length of the pipe will be reduced and detection of failure is easier, but the installation of a pipe with the system suspended in the sea will cause a very large deflection. Deflection due to pipe weight, weight, concrete weight, waves and currents will cause a failure in construction (broken pipe). The closer to the surface, the greater the influence of currents and waves. By using DHPE material and analyse the current and wave conditions in the left strait, suspended pipe installation is not recommended.

Piping on the seabed is more advantageous because of the effects of waves and low currents, higher construction stability, small pipe deformation due to sealing of the seabed and this method is used the most in the installation of subsea pipelines, so it is more tested so that installation of pipelines at the bottom of the sea is recommended. But this installation model also has weaknesses, so all these weaknesses must be anticipated. Weaknesses of this method the total length of the larger pipe requires an in-depth study of conditions on the seabed because of the possibility of failure that could occur due to interactions between the pipe and the seabed.

ACKNOWLEDGEMENTS

The authors would like to thanks the Universitas Tarumanagara, and Universitas Khairun, Ternate, Indonesia for funding and SERI-UKM for support.

REFERENCES

[1] Hardi W., Suyono T. 2016. Teknik Pemasangan Pipa Air Minum Bawah Laut dengan Metode TT dari Pulau Tidore ke Pulau Maitara. Semnas Maritim, Sains dan Teknologi Terapan, Vol. 01. ISSN: 2548-1309.

[2] Hakim A. L. 2012. Perancangan Pipa Bawah Laut. Institut Teknologi 10 Nopember, Surabaya.

[3] Cheung B. C., Carriveau R., Ting D. S. K. 2014. Param Affecting Scalable Underwater Compressed Air Energy Storage. Applied Energy. 134: 239-247.

[4] Brennan M. K., Karimi M., Almeida F. C. L., de Lima F. K., Ayala P. C., Obata D., Paschoalini A. T., Kessissoglou N. 2017. On The Role of Vibro-Acoustics in Leak Detection for Plastic Water Distribution Pipes. Procedia Engineering. 199: 1330-1355.

[5] Erwanti S. R., Sasmito B., A Janu F., Haryadi Y. 2016. Analisis Free Span pada Jalur Pipa Bawah Laut menggunakan Multibeam Echosounder dan Side Scan Sonar. Jurnal Geodesi Undip. 5(1).

[6] Guo B., Song, Shanhong Ghalambor, A., Lin T., Chacko J. 2005. Offshore Pipelines, 1st Edition. Gulf Professional Publishing. ISBN: 9780080456904.

[7] Ibrahim M., Masrevaniah A., Dermawan V. 2012. Analisa Hidrolis pada Komponen Sistem Distribusi Air Bersih dengan Waternet dan Watercad Versi 8 (Studi Kasus Kampung Digiouwa, Kampung Mawa dan Kampung Ikebo, Distrik Kamu, Kabupaten Dogiyai). Jurnal Pengairan, Universitas Brawijaya.

[8] Kiziloz B., Cevik E., Yuksel Y. 2013. Scour Below Submarine Pipelines under Irregular Wave Attack. Coastal Engineering. 79, 1-8.

[9] Cheng, L., Yeow, K., Zang, Z., Lie, F. 2014. 3D Scour below Pipelines under Waves and Combined Waves and Currents. Coastal Engineering 83: 137-149.

[10] Dey S., Singh N. P. 2007. Clear-Water Scour Depth below Underwater Pipelines. Journal of Hydro-enviroment Research 1: 157-162.

[11] Haq H. D., Kusuma G. E., Setiawan P. A. 2018. Desain Sistem Perpipaan di Area Pasang Surut Air Laut untuk Mencegah Terjadinya Potensi Buckling.

Proceeding 3rd Conference of Piping Engineering and its Application.

[12] Wang Y. G., Liao C. C., Wang J. H., Jeng D. S. 2018. Dynamic Response of Pipelines with Various Burial Depth Due to Underwater Explosion. Ocean Engineering. 164: 114-126.

[13] Abidin Z. 2008. Analisis On-Bottom Stability dan Instalasi Pipa Bawah Laut di Daerah Shore Approach. Skripsi. Fakultas Teknik Sipil dan Lingkungan, Institut Teknologi Bandung.

[14] Yan W., Li J., Bai X. 2016. Comprehensive Assessment and Visualized Monitoring of Urban Drinking Water Quality. Chemometrics and Intelligent Laboratory Systems. 155: 26-35.

[15] Suyono, T., Pranoto, W. A., Irawan, A. P. 2018. Hydraulic Analysis of Drinking Water Pipeline Inter Island. IOP Conference Series: Materials Science and Engineering 508: 012035.

[16] Pranoto, W. A., Suyono, T. 2018. Stability Analysis of Underwater Pipeline Inter Island for Drinking Water. Atlantis Highlights in Engineering (AHE), vol. 1. International Conference on Sciences and Technology (ICST).

Source details

ARPN Journal of Engineering and Applied Sciences

Open Access

Scopus coverage years: 2009, from 2011 to Present

Publisher: Asian Research Publishing Network (ARPN)

ISSN: 1819-6608

Subject area: Engineering: General Engineering

CiteScore 2018
0.50

SJR 2018
0.224

SNIP 2018
0.483

View all documents > | Set document alert | Save to source list | Journal Homepage

CiteScore | CiteScore rank & trend | CiteScore presets | Scopus content coverage

CiteScore 2018

Calculated using data from 30 April, 2019

$$0.50 = \frac{\text{Citation Count 2018}}{\text{Documents 2015 - 2017*}} = \frac{\text{2,564 Citations >}}{\text{5,138 Documents >}}$$

*CiteScore includes all available document types

View CiteScore methodology > | CiteScore FAQ >

CiteScore rank

Category	Rank	Percentile
Engineering └ General Engineering	#179/275	34th

View CiteScore trends >

Add CiteScore to your site

CiteScoreTracker 2019

Last updated on *09 April, 2020*
Updated monthly

$$0.55 = \frac{\text{Citation Count 2019}}{\text{Documents 2016 - 2018}} = \frac{\text{2,280 Citations to date >}}{\text{4,123 Documents to date>}}$$

Metrics displaying this icon are compiled according to Snowball Metrics ↗, a collaboration between industry and academia.

ARPN Journal of Engineering and Applied Sciences

Country	Pakistan - SIR Ranking of Pakistan
Subject Area and Category	Engineering Engineering (miscellaneous)
Publisher	Asian Research Publishing Network (ARPN)
Publication type	Journals
ISSN	18196608
Coverage	2011-ongoing
Scope	Information not localized

21

H Index

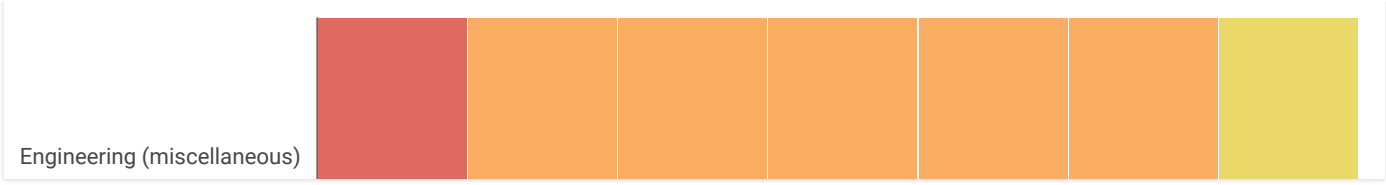
Homepage

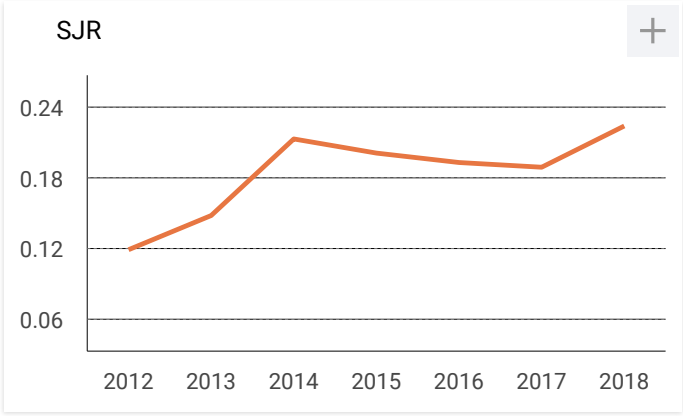
How to publish in this journal

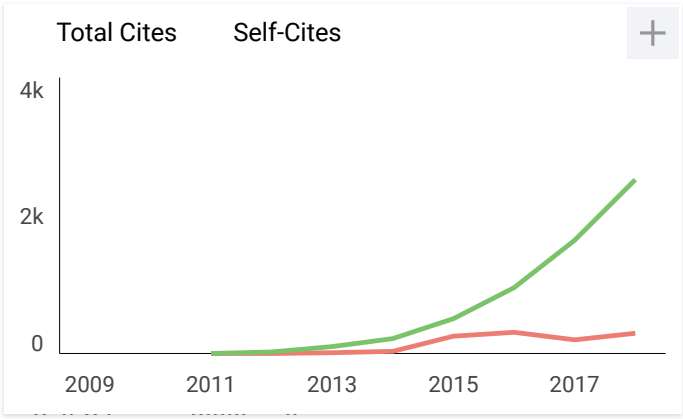
Contact

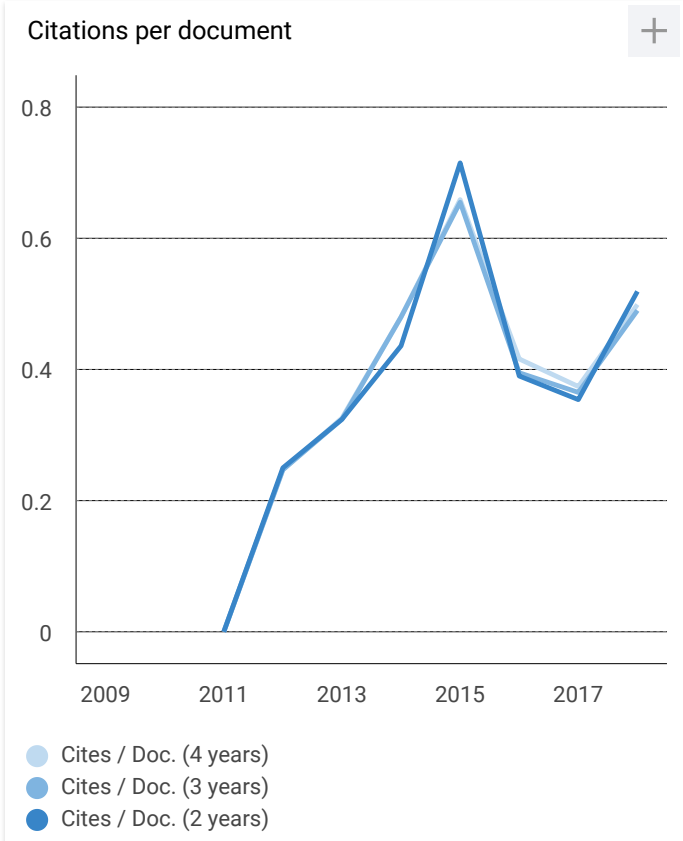
Join the conversation about this journal

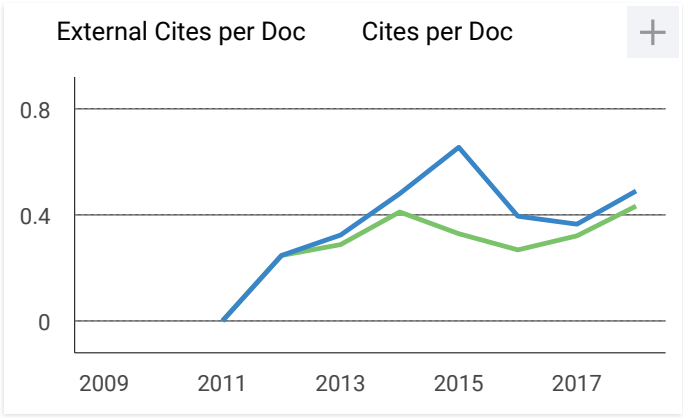
Quartiles

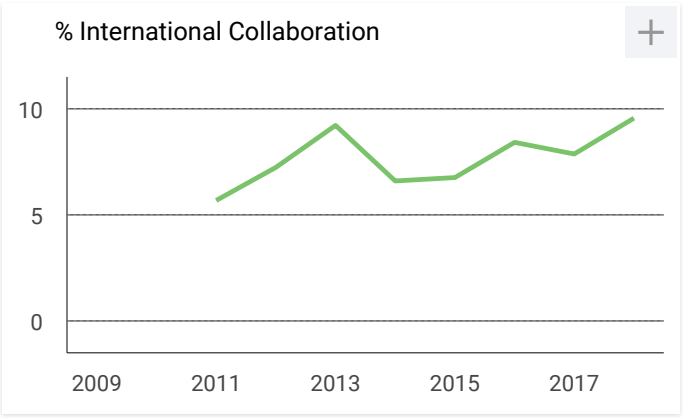


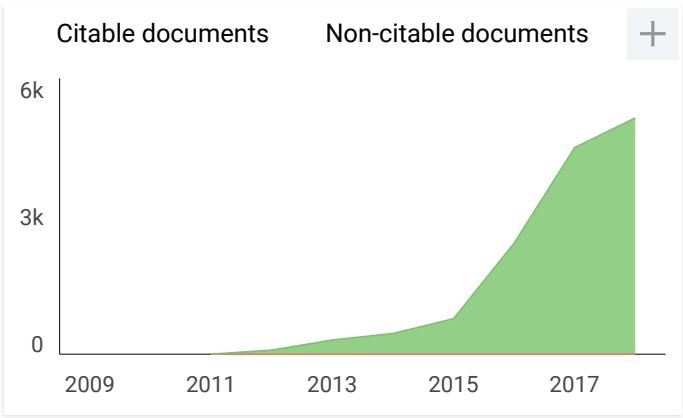


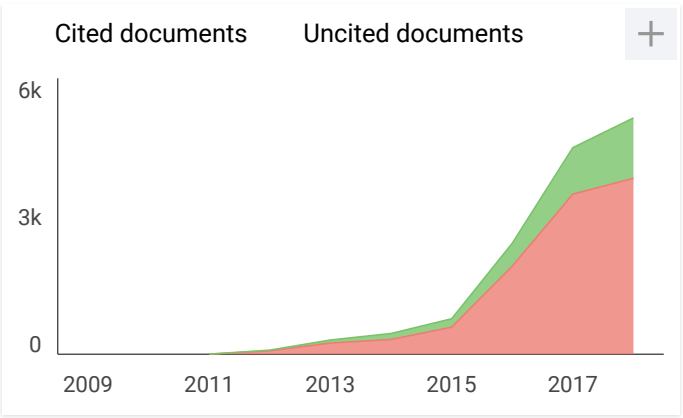






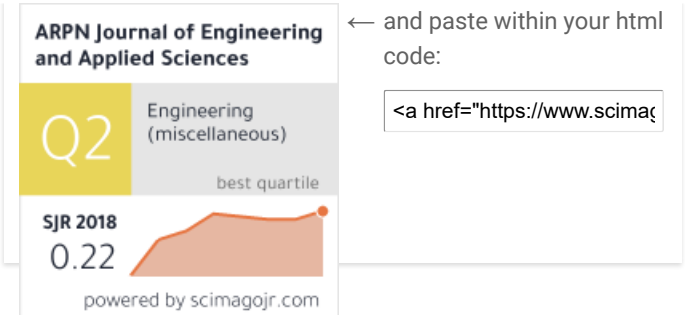






Show this widget in your own website

Just copy the code below



D **Dr Hala Abu-EL-Naga Hossein** 1 month ago

please what can I do ? this journal toke my money and did not publish my article .this journal is no longer open

reply

N **NOOR ALDEEN** 3 weeks ago

dear dr hala i already published 4 papers here , but its took years to publish

A **ahmed ashmawy** 3 weeks ago

the site was down last week, but the journal sent me mail today that they will process my paper. they are slow

F **Firdaus** 4 weeks ago

My article just been publish. I wait for 6 month.

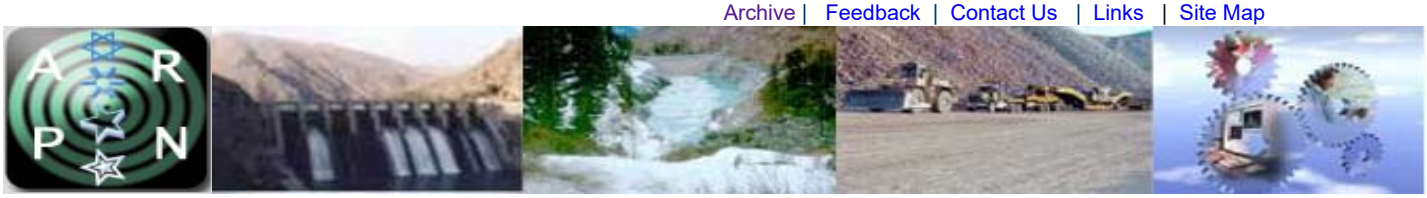
H **hassan yavari** 2 months ago

Be careful. This is a broker journal. I have been paying the article charge two years ago and they have not given me any answer except automated reply.

reply

H **Hala Hossein** 4 months ago

Hiو I have sent my research over
Three months ago, no one answered me. I sent the money but was booked. What can I do to check



ARPN Journal of Engineering and Applied Sciences

Home

Archive

Submit Paper

Author Guidelines

Editorial Board

Publication Fee

Editorial Board

Editor-in-Chief: Engr. J. K. Tarakzai (PAKISTAN)

#	Editors	Country
1	Prof. Dr. R. J. Godwin	UNITED KINGDOM
2	Prof. Dr. Erik Valdemar Cuevas Jimenez	GERMANY
3	Prof. Dr. Hamou SADAT	FRANCE
4	Dr. Mohammad Aminul Islam	JAPAN
5	Prof. Dr. Kui Fu Chen	CHINA
6	Prof. Dr. M. Ashraf Chaudhry	NEW ZEALAND
7	Prof. Dr. A. Sermet Anagun	TURKEY
8	Prof. Dr. Ashraf Mohamed Hemeida	Saudi Arabia
9	Prof. Dr. Krishna Murari Pandey	INDIA
10	Prof. Dr. Magdy A. Ezzat	EGYPT
11	Prof. Dr. Roberto Brighenti	ITALY
12	Dr. Anurag Misra	INDIA
13	Prof. Dr. Adel M. ALIMI	TUNISIA
14	Prof. Dr. Arun Kumar Gupta	INDIA
15	Prof. Demetrios V. Bandekas	GREECE
16	Prof. Dr. Bensafi Abd-El-Hamid	ALGERIA
17	Dr. Rajanish K. Kamat	INDIA
18	Prof. Dr. Asma Thamir Ibraheem	IRAQ
19	Prof. Dr. Sylejman Hyseni	KOSOVO
20	Prof. Dr. Haider Zaman	Saudi Arabia
21	Prof. Dr. Debojyoti Mitra	INDIA
22	Prof. Dr. Pandian VASANT	MALAYSIA
23	Prof. Dr. Prakash MMS Kinthada	INDIA
	Associate Editors	
1	Dr. Dongning Li	USA
2	Dr. Suheyla Yerel	TURKEY
3	Dr. Guoxiang Liu	USA
4	Dr. Nadeem Anjum	PAKISTAN
5	Engr. Malini Sarah Philip	NORWAY
6	Dr. K.V.L.N. Acharyulu	INDIA
7	Engr. Mohammad Khalily Dermany	IRAN
8	Dr. Lamyaa- Gamal Eldeen Taha	EGYPT
9	Dr. OM Prakash Singh	INDIA
10	Engr. Seyyed Mohammad Reza Farshchi	IRAN
11	Dr. Muhammad Imran Din	PAKISTAN
12	Dr. José Carlos Páscoa Marques	PORTUGAL
13	Engr. Fawwaz Jinan Jibrael Jabri	IRAQ
14	Dr. Kanad Ray	INDIA

15	Dr. Shamsuddin Shahid	MALAYSIA
16	Engr. Naveenji Arun	INDIA

ARPN Journal of Engineering and Applied Sciences ISSN 1819-6608 (Online)

ARPN Journal of Engineering and Applied Sciences April 2020 | Vol. 15 No. 7

Title: Very short-term load forecasting of peak load time using Fuzzy type-2 and big bang big crunch (BBBC) algorithm

Author (s): Jamaaluddin Jamaaluddin, Imam Robandi, Izza Anshory and Ahmad Fudholi

Abstract: Very short-term energy forecasting is done on a day before the day of operation. Forecasting of short-term load is done every 30 minutes of forecasting hours. Very short-term load forecasting is carried out continuing forecasting short-term load with daily intervals, load on a given day or weekly load to be more detailed with very short-term load forecasting. This weight forecasting is done to improve operational effectiveness and efficiency. Forecasting short-term loads have been done using artificial intelligence, nowadays artificial intelligence is attempted to predict a very short term load. In this study, investigated the use of the Fuzzy type-2 (FT-2) and big bang big crunch (BBBC) algorithm for the very short-term load forecasting. Results shows that with the use of FT-2-BBBC, it will get a small error because it uses low computation cost and high convergent speed. In addition, FT-2 also optimizes the foot of uncertainty of the Fuzzy type-1. The results are in the use of FT-2-BBBC hence the very short term load forecasting error value of 0.7278%. This suggests that FT-2-BBBC can be used to perform electrical load forecasting and other forecasting.

Full Text

Title: Comparison between suspended or seabed pipeline installation for inter island fresh water system

Author (s): Tri Suyono, Agustinus Purna Irawan, Wati Asriningsih Pranoto and Ahmad Fudholi

Abstract: Provision of drinking water in small islands that do not have the potential for fresh water needs to be done with several alternative technology applications. One of the technologies being carried out is by installing underwater drinking water pipes. Taking into account the operational technical factors, at sea depths above 30 meters, several considerations need to be taken into account, given that installing pipes at these depths is difficult to control pipes manually, so additional equipment is needed for the safety of workers who will control the installed pipes, so this problem the best solution must be found. One problem that must be considered is the selection of pipe specifications that must meet technical requirements. Pipeline selection is carried out by conducting a study through the pipeline model and needs to be studied carefully and thoroughly so that the installed pipe is completely safe in the sea and does not suffer damage due to forces acting on the pipe caused by ocean currents, waves and underwater conditions others. The installation model that will be examined is the installation model suspended in the sea and installation on the sea floor. From the results of the analysis conducted on the pipe suspended in the sea with a depth of over 30 meters and the installation of pipes on the seabed shows that the pipe installed in the sea is more stable both from the effects of waves and ocean currents with a smaller deformation value compared to the pipe that is installed Suspended in in the sea. Pipe installed Suspended in the sea with a span of 2,500 meters and given a weight of 65 kg with a distance of 12 meters can experience vertical deflection down to 2,775,326 mm. Pipes placed at the bottom of the sea are more stable because the flow of waves and waves is already small so that the pipes are more stable and do not oscillate. The recommended pipe installation is seabed with pipe specifications in accordance with the conditions of the Hiri Strait, namely HDPE pipes with a nominal pressure of at least 25 bar.

Full Text

Title: Performance evaluation of the G.729, AMR and iLBC voice codecs on LTE- ADVANCED

Author (s): Jesús D. Quintero P., Martin D. Bravo O. and José J. Salgado P.

Abstract: This article presents a referential framework given by an exhaustive analysis of the quality of the service concerning the G.729, AMR, and iLBC coding standards on LTE-A (LTE-ADVANCED) technology. The architecture that forms the LTE-A technology, making a particular focus on the characteristics that make up its OFDMA interface (Orthogonal Frequency Division Multiple Access). Simulations of the scenarios are implemented, showing data on the traffic generated by a certain number of users. On the other hand, an algorithm was performed to extract the generated packet by the voice encoders and the transmitting according to the networking traffic information; it offered by the simulator. Finally, the objective and subjective evaluations were realized, and the results of the voice service quality on IP (VoIP) are presented, taking into account the packet loss.

Full Text

Title: Pressure and pressure derivative interpretation for vertical wells in naturally fractured and compressible formations

Author (s): Guiber Olaya-Marin, Freddy H. Escobar and Faiber Robayo

Abstract: An improved methodology for well test interpretation homogeneous and naturally fractured and compressible reservoirs with a single fluid is presented. New expression to find the permeability, permeability modulus and geomechanical skin factor from slope during radial flow regime have been introduced and corrections of for the minimum point and the intercept between the unit-slope line taking place during the transition period and the radial flow regime are given so existing equations in the literature can be applied for the determination of the naturally fractured reservoir parameters. These new expressions were successfully applied to synthetic examples.

Full Text

Title: An innovative kernel function for the NLM filtering

Author (s): Zayed M. Ramadan

Abstract: The Gaussian and exponential weighting functions have been used for a long time as standard functions in the conventional nonlocal means (NLM) filtering method and its variants. In this paper, a new weighting function is proposed and tested experimentally in the NLM method. This function is a power-of-two function that is used to measure the similarity between pixels in the reference and search patches of the image pixels. Six images of different features and amounts of details are used in the simulations. Those images were subject to zero mean Gaussian noise with various levels of standard deviation. Peak signal to noise ratio (PSNR) and structural similarity (SSIM) have been used as quantitative indices to measure the performance quality of the proposed weighting function compared to that of the exponential and Gaussian functions. The proposed function outperforms the exponential function in all the tested images and for all values of noise standard deviations, and produces similar results and sometimes slightly better than those of the Gaussian weighting function.

Full Text

Title: Increasing of the heat and mass transfer processes efficiency with the application of non-uniform fluidization

Author (s): Yaroslav M. Kornienko, Serhii S. Haidai, Roman V. Sachok, Andrii M. Liubeka and Bogdan Y. Korniyenko

Abstract: The use of non-uniform jet-pulsating mode of fluidization allows increasing the intensity of diffusion-controlled processes of mass isothermal crystallization in granulation of liquid heterogeneous systems due to the intensive volumetric mixing of granular material by pulsating removal beyond the initial layer up to 40% of its mass with a frequency of 1.6...1.8 Hz. Efficiency of application of the non-uniform jet-pulsating mode of fluidization is confirmed by the granulation of multi component liquid heterogeneous systems with obtaining humic-potassium-nitrogen-calcium-sulfur-containing fertilizer with micro-impurities of magnesium and phosphorus with chemical composition [Hum.]:[K]:[N]:[Ca]:[S]:[Mg]:[?]=[1.5]:[21.5]:[9.1]:[13.8]:[4.6]:[3.2]:[1.8] with a layered structure, spherical shape with an equivalent diameter in the range daverage=2.2...3.6 mm and a strength P greater than 12 N per granule. In this case the granulation coefficient ψ is more than 85%, and the average specific load of bed by moisture is at least 1.5 times higher than this index in the case of homogeneous fluidization.

Full Text

Title: Lipid panel tests: Design and implementation of an information system for results recording and consulting

Author (s): Albeiro Cortes Cabezas, Cesar A. Perdomo Ch. and Julián Rolando Camargo López.

Abstract: The main aim of this work was to create a healthcare information system that allows to medical and laboratory staff, authorize, register and consult data about the lipid panel tests made to the patients. This paper presents the design and implementation of an information system for the registration, organization and analysis of lipid panel tests results in the hospitals of the Department of Huila in Colombia according to the standards HL7-FHIR (Health Level 7 - Fast Healthcare Interoperability Resources). A result, an information system was designed and implemented using free software as java, html5, css3, etc. It was concluded that the proposed information system cans reduce the execution time and facilitate the work of the medical staff when lipid panel tests are performed.

Full Text

Title: Preparation of metal powders from silver melt for 3D printing by melt dispersion method

Author (s): Masanskii Oleg A., Tokmin Alekcandr M., Kazakov Vladimir S., Bezruchko Alekcandr B., Gilmanshina Tatiana R., Lytkina Svetlana I., Kaposko Inga A. and Khudonogov Sergey A.

Abstract: The development and introduction of additive technologies in modern industry is due to the need of production in reducing waste, reducing the anthropogenic load on the environment and improving the environmental friendliness of production, reducing labor costs and improving technical and economic indicators, automation of the technological process in obtaining products for various purposes. The increase in the number of technological solutions that allow 3D printing is due to the mass interest in this issue, the availability of modern technologies and materials that make it possible to design, test and use printers in experimental and production conditions. The purpose of this work is to develop technological parameters for obtaining metal powder from silver melt for 3D technology by dispersion method. In the course of the work it was found that the formation of particles is significantly influenced by the breaking angles of the silver melt with high-pressure water. Studies have shown that to obtain particles whose shape is close to spherical, with a diameter of 45–500 microns, it is effective to use the splitting angles α=45°, β=42°. Upon receipt of the powder with the corners split α=30°, β=45° и α=β=45° are formed irregular particles on the surface and discovered oxygen in the amount of 1.16 is 7.80 %.

Full Text

Title: Control system for obtaining water from air dehumidification by Peltier cells

Author (s): Faiber Robayo Betancourt, Jesús D. Quintero-Polanco and Ferley Medina Rojas

Abstract: In this article the implementation of a dehumidification system based on Peltier cells that allows water particles condensation from the air is presented. A PI (Proportional Integral) control design leads the temperature from the cold cell face toward the dew point to improve the system performance. The system performance is evaluated comparing the system operation without control with the controlled system, in order to set the improvements that allows increase water production and reduce the electric power consumption. These tests indicate that when applying control, the water production increases, while power consumption is reduced, evidencing a remarkable improvement in system efficiency.

Full Text

Title: The experimental studies of the automatic control methods of magnetic separators performance by magnetic product

Author (s): Jamil Abedalrahim Jamil Alsayaydeh, Win Adiyansyah Indra, Adam Wong Yoon Khang, A. K. M. Zakir Hossain, Vadym Shkarupylo and J. Pusppanathan

Abstract: The objective of this article is to experimentally test for the automatic control of the magnetic separator efficiency of the magnetic product. The developed process depends on the fact that the electromotive force in electric coil located on the pole of the magnetic system of the separation depends on its efficiency with the magnetic product. A functional scheme of the measurement process is given to achieve a magnetic separator by the magnetic product. The theoretical formulas that describe the formation of a pulsed magnetic field in a magnetic separation zone are presented and the magnetic induction of this field is based on the physical variables that characterize the operating system of the damp

magnetic drum class. The theoretical reliance of the magnetic induction of the magnetic field in the working zone on the amount of magnetite in the concentrate layer on the surface of the separator drum is determined. The methodology and functional scheme for conducting experimental studies in an industrial environment of an iron ore-dressing factory of the proposed automatic control method is given. The method includes conducting a passive experiment, including the selection of technological samples and their analysis with simultaneous recording of voltmeter readings, which measure the voltage at the output of the electric coil located on the pole piece of the magnetic system of the separator. Mathematical treatment of the results of experimental studies was performed through regression analysis method. The regression equation that connects the size of the electric driving force is obtained in the coil and the magnetic separator performance of the magnetic product is performed. It is concluded that the magnetic separator performance of the magnetic product is sufficiently accurate. The results obtained allow us to develop a system for automatically controlling the performance of a magnetic separator.

Full Text

Title: Investigating the non-linear behavior of RC framed structures with semi-rigid joints under vertical and lateral load excitation

Author (s): Khair Al-Deen Bsisu and Ibrahim Altarabsheh

Abstract: This study aims at investigating the nonlinear behavior of adequate reinforced concrete frames with semi-rigid connections under high lateral load and comparing them to the moment resisting systems. These two systems were compared based on their energy dissipation capacity, inter-storey drift ratio, force distribution, ductility, failure mechanism, and self-centering capacity. Also, this study aims at evaluating important parameters for the Reinforced concrete building with semi rigid connections such as over-strength factor, ductility, and response modification factor and compare them with that of moment resisting system. A complete three-dimensional finite element model for the RC connections is developed using ANSYS finite element software to determine the moment rotation curve for the connections based on their size, concrete strength and reinforcement details. SAP2000 finite element analysis model is performed to investigate the impact of semi rigid connections on the nonlinear behavior of RC buildings. The seismic force and displacement demand on the proposed system are determined using nonlinear time history analysis. Moreover, the maximum displacement that the building can withstand is determined using pushover analysis. The study concluded that considering RC beam-column joint as a rigid connection, will significantly overestimate the stiffness of RC buildings and will give erroneous structural responses under earthquake loading.

Full Text

Title: Onboard obstacle sensing mechanism for Drones using Monocular camera

Author (s): Aswini N. and Uma S. V.

Abstract: Unmanned Aerial Vehicles (UAV) commonly known as Drones, have become so popular in recent years because of their enormous technical development and demand in both the Military and Civil sectors. "No risk of human life" is the biggest advantage of drones. To become completely autonomous, there is a need for an Onboard Obstacle Sensing Mechanism (OOSM) to detect and avoid a collision. Most of the drones used now in the market have inbuilt cameras that can perform video recording. These videos are sent to the ground control station and are processed using suitable obstacle detection algorithms. The necessary commands are sent back to the drones for further manoeuvres. In a real-time application, obstacle detection becomes difficult when there is a need to process videos from a Monocular camera. By this work, an attempt is made to detect frontal obstacles using computer vision techniques, measure their distance from the monocular camera using a mathematical approach. The direction from which the obstacles are approaching is also estimated by calculating the centroid of each image frame.

Full Text
