Global Journal of Researches in Engineering: E
Civil And Structural Engineering
Volume 17 Issue 3 Version 1.0 Year 2017
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

Mechanical Properties and Microstructures of Regenerated Cement from Waste Concrete

By Yileng Du & Hongjuan Zuo
University Technical College Portsmouth

Abstract- It has been a long time since humans started using waste materials in engineering applications. This approach not only reduces the yield of waste, while minimizing the costs of disposal but also limit the cost of new materials. In the field of construction, the reuse of waste concretes has been a strong research in recent years. However the processing of the wastes normally involves complicated processing and lab equipment. In this report we crush and dehydrate waste concretes with normal lab facilities and re-make the cement composites. The waste concretes were crushed and dehydrated at two temperatures, 1280 and 1400˚ C. To balance the concentration of silica and lime, extra lime at 28.5% and 16% were added to the waste concretes. The resultant materials were evaluated with respect to the chemical composition, mechanical properties, and microstructures. It is concluded that the material dehydrated at 1400˚C and containing 28.5% lime presents the best mechanical performance. This report presents a simple and inexpensive method to reuse the waste concretes in applications such as pavements.

Keywords: *waste concrete, regenerated cement, mechanical properties, microstructures.*

GJRE-E Classification: *FOR Code: 090506*

MECHANICALPROPERTIESANDMICROSTRUCTURESOFREGENERATEDCEMENTFROMWASTECONCRETE

Strictly as per the compliance and regulations of:

Mechanical Properties and Microstructures of Regenerated Cement from Waste Concrete

Yileng Du [α] & Hongjuan Zuo [σ]

Abstract- It has been a long time since humans started using waste materials in engineering applications. This approach not only reduces the yield of waste, while minimizing the costs of disposal but also limit the cost of new materials. In the field of construction, the reuse of waste concretes has been a strong research in recent years. However the processing of the wastes normally involves complicated processing and lab equipment. In this report we crush and dehydrate waste concretes with normal lab facilities and re-make the cement composites. The waste concretes were crushed and dehydrated at two temperatures, 1280 and 1400˚ C. To balance the concentration of silica and lime, extra lime at 28.5% and 16% were added to the waste concretes. The resultant materials were evaluated with respect to the chemical composition, mechanical properties, and microstructures. It is concluded that the material dehydrated at 1400 ˚C and containing 28.5% lime presents the best mechanical performance. This report presents a simple and inexpensive method to reuse the waste concretes in applications such as pavements.

Keywords: waste concrete, regenerated cement, mechanical properties, microstructures.

I. Introduction

As a result of modernization, new consumer behaviors generate waste with exponential increase, in a variety of different divisions of the society. Inappropriate treatment of these wastes, lead to strong negative impacts to the environment. As an applicable and effective method to deal with the waste materials, incorporating the wastes into new products can not only reduce the amount of wastes, but also reduce the cost of industrial manufacturing and production [1,2]. In the section of construction and buildings, the waste concretes cause many environmental and health issues, while more and more concretes are used these years. In the meantime, the production of cements are facing a shortage of the source materials [3-5]. The global market for construction aggregates is consistently increasing [6-9]. Development has inflicted severe damage on the environment and may endanger its sustainability. The exploitation of natural resources, in particular non-renewable resources, for construction purposes leads to millions of tons of construction and demolition waste every year [10,11]. Since most countries have no specific processing plan for these materials, they are sent to landfill instead of being reused and recycled in new construction. Of the wastes generated by the construction and demolition activities, a significant amount are the mineral waste or soils, such as excavated earth, road construction waste, demolition waste, waste rocks [12,13]. The share of mineral and solidified wastes in relation to the total amount of waste produced was very large [14-18]. A natural approach to solve these pressing problems is to re-use the waste concretes. Whilst recycling is often cited as the best way to manage waste, there are still challenges to utilize waste concretes in construction, such as the uncertainty as to its environmental benefits, low quality of the final product, owing to lack of knowledge [19-23]. Waste concrete materials are being increasingly used in constructions. Targeting engineering applicability, waste concretes should be standardized for the key parameters such as gravel size, specific gravity, water absorption ratio, and crushing values should be determined, and these aggregates should be separated from wood, ceramics, iron, and so on [24-28]. Waste concretes are mostly used as protective barrier and ground-filling material against erosion. In such large-scale projects as rebuilding roads and runways, using waste concretes will reduce the cost of removal of the debris [29-32]. The utilization of waste concretes is increasingly gaining popularity in many countries [33-35]. A lot of labs separates the hardened cement pastes from the waste concretes and then dehydrate the cement pastes at high temperature to generate the recycled cements. However, this method only uses a portion of the waste materials at low efficiency. Waste concretes are crushed and ground by means of different methods so that they could be used as concrete aggregates [36,37]. Waste concrete can be crushed into different sizes of aggregates. In comparison with normal concrete, Waste concretes have a higher water absorption ratio but a lower specific gravity. The mortar percentage used in waste concrete obtained from crushed concrete of destroyed structures was determined via linear traverse method [38-40]. Workability of concrete wastes is normally not good, and hence water amount often needs to be increased [41,42]. However, it is inevitable that cement ratio will increase in proportion to water added. Therefore, it would be desirable to obtain finer aggregates in order for a proper workability [43]. It is worth noting that the $CaCO_3$ based aggregates produce materials that share similar chemical compositions with the dehydrated cement

Author α σ: University Technical College Portsmouth, 468 London Rd, Portsmouth PO2 9RN, UK. e-mail: duyilengeric@gmail.com

paste and hence it may be a viable approach to utilize the dehydrated concretes directly and avoiding the separation step. Currently there are not many results on the utilization of the full composition of waste concretes. In this paper, we use the waste concretes with $CaCO_3$ based aggregates as the source materials to regenerate cementitious materials. This method is much easier and less cost-consuming in construction activitities. We used high temperature kiln to dehydrate the crushed waste concretes and then we studied the chemical composition, mechanical properties and the microstructures of the regenerated concretes. These results will provide guidance on the engineering utility of the waste concretes in construction.

II. Experiments

The waste concretes were kindly provided by QUATTRO UK LTD from a source of demolished building. The materials were broken and ground into powders and sieved at 800 μm. Because the full compositions were dehydrated, the materials contain a large amount of SiO_2 from the fine aggregates. For this reason we added an extra amount of lime of 28.5% or 16% in weight to balance the compositions of Ca and Si. In addition, extra Fe and Al oxides were also added at about 1%. The mixed raw materials are dehydrated at two different temperatures 1280 and 1400 °C for about 1 hour. The dehydrated materials are quickly cooled down to room temperature. The processing is presented in Figure 1.

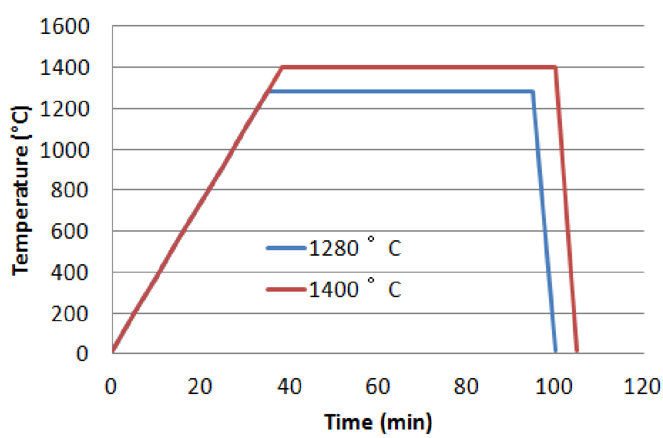


Figure 1: Temperature processing of the waste concrete

The chemical compositions were first analyzed with x-ray diffraction (XRD) with a Bruker D8 instrument. In total four different materials are prepared to compare these two parameters, as shown in Table 1. Another control sample with no waste concrete was also prepared and studies for comparison purpose.

Table 1: The four materials with different addition of $CaCO_3$ and dehydration temperatures

Material ID	$CaCO_3$	Dehydration temp. (°C)
1	28.5%	1280
2	16%	1280
3	28.5%	1400
4	16%	1400

The mixing procedures follow the ASTM standard C305 – 14. The resulting fresh materials are cast into plastic cylinder molds with the aid of vibration. All samples were sealed and kept at room temperature and demolded on the day of testings. The samples were subject to compressive and tensile tests at three different ages, 1, 7 and 28 days, with a MTS universal test machine. To understand the mechanism behind the mechanical properties, scanning electron microscopic (SEM) images were taken on the concretes at the age of 28 days.

III. Results

a) Chemical Composition

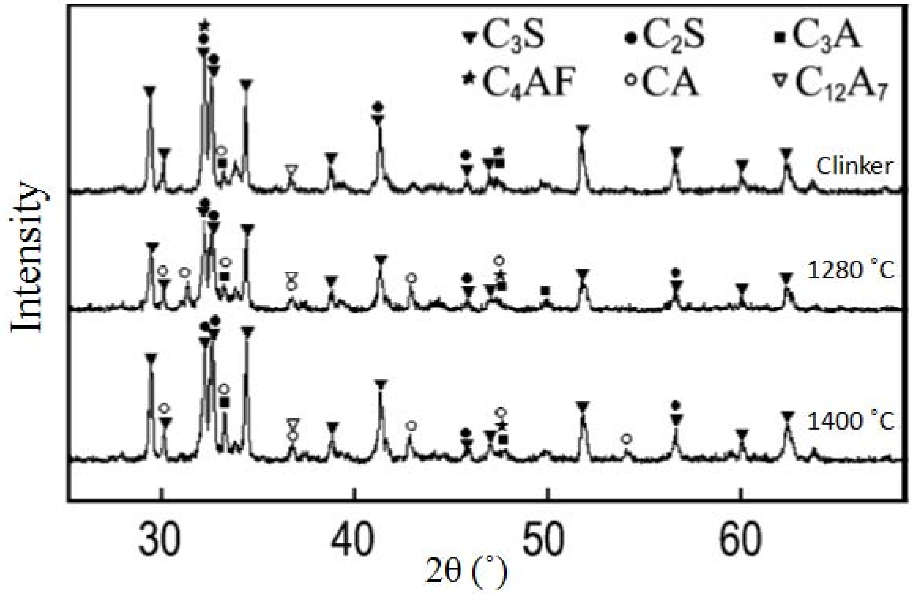
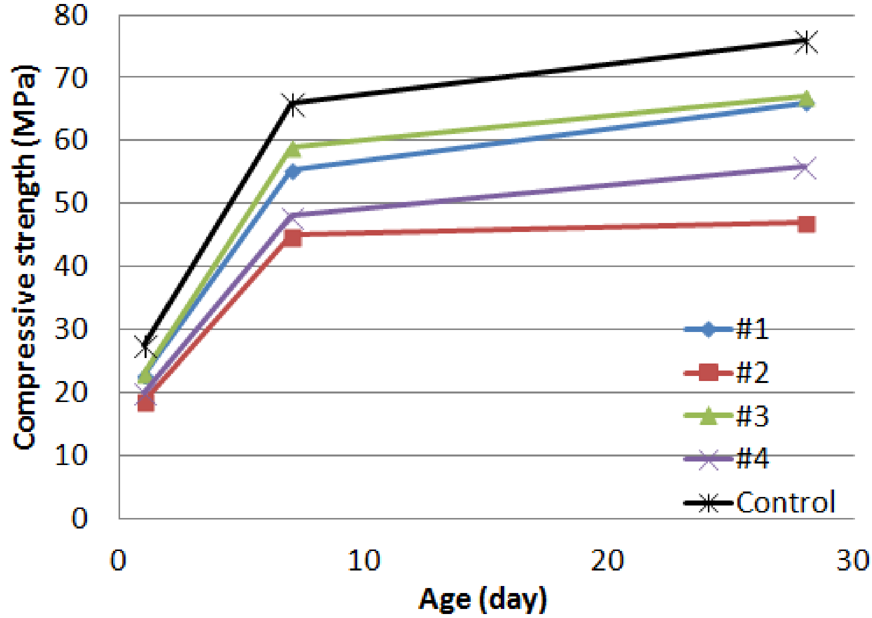


Figure 2: XRD patterns of the dehydrated cement pastes and the raw clinker

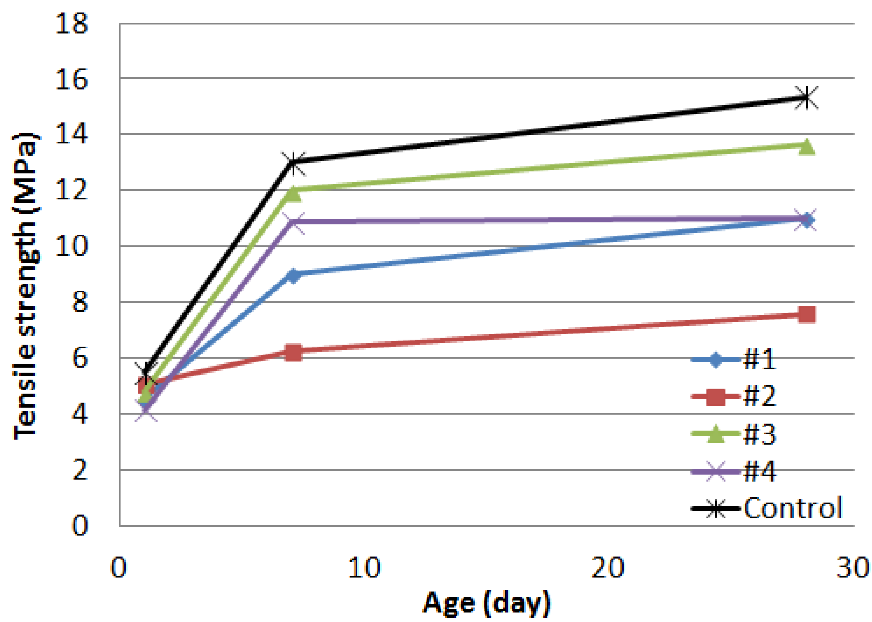
The dehydrated pastes were analyzed with XRD and the results are presented in Figure 2. It is clearly seen that the both dehydrated samples, the characteristic peaks of C_3S, C_2S, C_3A, and C_4AF are present, which are consistent with the ordinary clinkers. It is noteworthy that the phases of CSH and CH are not seen in the dehydrated materials, which means that the dehydration is completed. While it is challenging to quantitatively calculate the respective compositions of each material based on the relative intensities of the XRD peaks, it is concluded the compositions are similar among the dehydrated paste and the raw clinker. Especially there is no obvious difference between the materials dehydrated at 1280 ˚C and 1400 ˚C.

b) Mechanical Properties

The mechanical properties of the waste replaced samples were compared with studies of compressive tests and tensile tests. The results are also compared with the a control mix without waste replacement. Figure 3 shows the results of compressive strength at the three different ages. As expected, the overall strengths are decreased when the waste materials are used. And with more replacement, the strength are even lower. It is noticeable that the at higher processing temperature 1400 ˚C, the overall strengths are higher than 1280 ˚C, which is because at the higher temperature, the waste materials are more fully converted to the clinkers, allowing complete reaction between cement and water. An incomplete conversion from hydration products to clinkers may leave the unavailability of reaction spots in the matrix phase, resulting in a non-uniform microstructures. This is the reason causing the premature failures. However it should be noted that the reduction in mechanical properties were not so enormous. Especially for the samples are processed under 1400˚C. The strengths are lowered less than 20%. These materials are apparently feasible for applications such as low level buildings or pavements. The cost will be significantly lower than using raw cement.



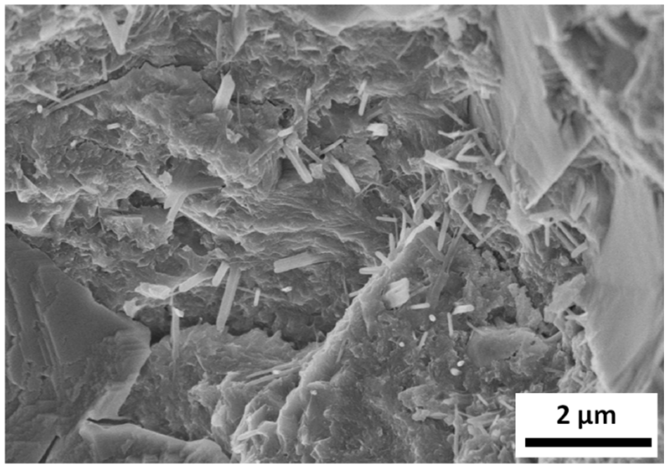
(a)



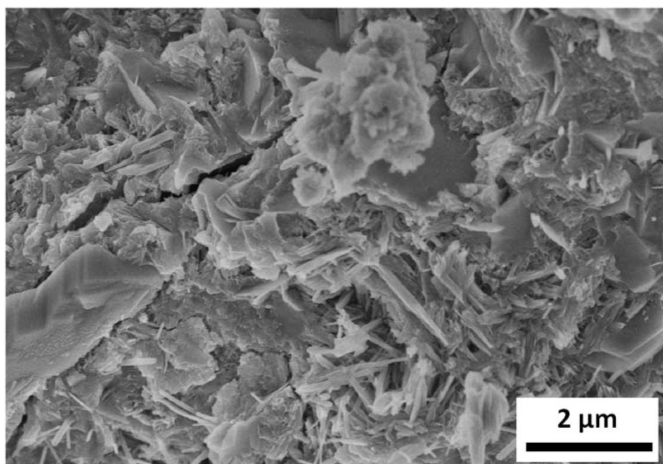
(b)

Figure 3: (a) Compressive strengths and (b) tensile strengths of the four mixtures and the control sample

c) Microstructures



(a)



(b)

Figure 4: The SEM images of hydrated cement paste at the age of 28 days for (a) control sample and (b) sample with dehydrated wastes at 1400 ˚C

The SEM images (SEI mode) of the cement paste are shown in Figure 4. The CSH and CH grains are clearly observed in the sample. The morphology of the hydration products with from the waste materials are similar with the normal pastes. In both samples, the CSH gel can be clearly observed, as well as the CH plates and AFt crystals. Comparing these two samples, it is noticed that the amount of the AFt crystals in the waste concrete sample in much less than the control sample, which may be responsible for the lower mechanical properties. It is also noted that in the sample with the regenerated cement, there is a through crack, which may be due to the weak binding between the CSH gels and other hydration products. This is also a viable mechanism to explain the diminished mechanical properties of the concretes from regenerated cement. Other than that, it seems there are no apparent differences in the microstructures between the two samples verifying the validity of using the dehydrated waste concrete to develop new materials.

IV. Conclusion

In this work, the waste concretes were processed at temperatures of 1280 and 1400 °C. The resulting dehydrated materials were directly added to mix with cement. The resulting mechanical properties are lower than those of normal concrete samples. The microstructures and CSH are also similar with the normal concretes. It is applicable to use these waste concretes for construction that does not necessitate high strengths, such as pavement and single-storey house. This work provides opportunities of using waste demolished concretes, reducing cost while having a positive impact to the environment.

Global Journal of Researches in Engineering (E) Volume XVII Issue III Version I Year 2017

References Références Referencias

1. Dong, Y.; Li, X.; Zhao, Q.; Yang, J.; Dao, M.: Modeling of shrinkage during investment casting of thin-walled hollow turbine blades. *Journal of Materials Processing Technology* **2017**, *244*, 14.
2. Dong, Y.; Li, X.; Zhao, Q.; Li, X.; Dou, Y.: Geometrical modeling to improve the accuracy of drilled cooling holes on turbine blades. *International Journal of Advanced Manufacturing Technology* **2017**, 20.
3. Hu, Z.; Lu, W.; Thouless, M. D.: Slip and wear at a corner with Coulomb friction and an interfacial strength. *Wear* **2015**, *338-339*, 10.
4. Hu, Z.; Lu, W.; Thouless, M. D.; Barber, J. R.: Simulation of wear evolution using fictitious eigenstrains. *Tribology International* **2015**, *82*, 4.
5. Du, X.; El-Khamy, M.; Lee, J.; Davis, L.: Fused DNN: A deep neural network fusion approach to fast and robust pedestrian detection. *Applications of Computer Vision (WACV), 2017 IEEE Winter Conference* **2017**, 9.
6. Yang, Z.; Wang, J.; Evans, D.; Mi, N.: AutoReplica: Automatic Data Replica Manager in Distributed Caching and Data Processing Systems. *1st IEEE International Workshop on Communication, Computing, and Networking in Cyber Physical Systems (CCNCPS 2016)* **2016**.
7. Yang, Z.; Awasthi, M.; Ghosh, M.; Mi, N.: A Fresh Perspective on Total Cost of Ownership Models for Flash Storage in Datacenters. *8th IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2016)* **2016**.
8. Wykes, M. S. D.; Palacci, J.; Adachi, T.; Ristroph, L.; Zhong, X.; Ward, M. D.; Zhang, J.; Shelley, M. J.: Dynamic self-assembly of microscale rotors and swimmers. *Soft Matter* **2016**, *12*, 6.
9. Sun, Y.; Kang, C.; Zhang, A.; Liu, F.; Hu, J.; Zhong, X.; Xie, J.: Co-delivery of dual-drugs with nanoparticle to overcome multidrug resistance. *European Journal of BioMedical Research* **2016**, *2*, 7.
10. Cao, Y.; Zavaterri, P.; Youngblood, J.; Moon, R.; Weiss, J.: The influence of cellulose nanocrystal additions on the performance of cement paste. *Cement and Concrete Composites* **2015**, *56*, 11.
11. Cao, Y.; Tian, N.; Bahr, D.; Zavattieri, P. D.; Youngblood, J.; Moon, R. J.; Weiss, J.: The influence of cellulose nanocrystals on the microstructure of cement paste. *Cement and Concrete Composites* **2016**, *76*, 10.
12. Cai, W.; Wu, B.; Wu, N.: 2.4 GHz Class F Power Amplifier for Healthcare Application. *International Journal of Computer Science and Information Technologies* **2016**, *7*, 5.
13. Cai, W.; Huang, L.; Wen, W.: 2.4GHZ Class AB Power Amplifier for Wireless Medical Sensor Network. *International Journal of Enhanced Research in Science, Technology & Engineering* **2016**, *5*, 5.
14. Wang, L.-p.; Chen, B.-y.; Chen, C.; Chen, Z.-s.; Liu, G.-l.: Application of linear mean-square estimation in ocean engineering. *China Ocean Engineering* **2016**, *30*, 12.
15. Wang, L.-p.; Chen, B.-y.; Zhang, J.-f.; Chen, Z.: A new model for calculating the design wave height in typhoon-affected sea areas. *Nat Hazar* **2013**, *67*, 15.
16. Cai, W.; Gong, J.; Wu, N.: 2.4GHZ Class F Power Amplifier for Wireless Medical Sensor Network. *Proceedings of the 2nd World Congress on New Technologies* **2016**, 7.
17. Cai, W.; Huang, L.; Wu, N.: Class E Power Amplifier for Wireless Medical Sensor Network. *International Journal of Enhanced Research in Science, Technology & Engineering* **2016**, *5*, 6.
18. Cao, Y.; Weiss, J.; Youngblood, J.; Moon, R.; Zavattieri, P.: Performance-enhanced cementitious materials by cellulose nanocrystal additions. *Production and Applications of Cellulose Nanomaterials* **2013**, 2.
19. Dong, Y.; Bu, K.; Dou, Y.; Zhang, D.: Determination of interfacial heat-transfer coefficient during investment-casting process of single-crystal blades. *Journal of materials processing technology* **2011**, *211*, 9.
20. Dong, Y.; Zhang, D.; Bu, K.; Dou, Y.; Wang, W.: Geometric parameter-based optimization of the die profile for the investment casting of aerofoil-shaped turbine blades. *The International Journal of Advanced Manufacturing Technology* **2011**, *57*.
21. Dong, Y.; Kun, B.; Dou, Y.; Zhang, D.: Determination of wax pattern die profile for investment casting of turbine blades. *Transactions of nonferrous metals society of China* **2011**, *21*, 10.
22. Cai, W.; Shi, F.: DESIGN OF LOW POWER MEDICAL DEVICE. *International Journal of VLSI design & Communication Systems (VLSICS)* **2017**, *8*, 7.
23. Cao, Y.; Zavattieri, P.; Youngblood, J.; Moon, R.; Weiss, J.: The relationship between cellulose nanocrystal dispersion and strength. *Construction and Building Materials* **2016**, *119*, 9.
24. Hu, Z.; Lu, W.; Thouless, M. D.; Barber, J. R.: Effect of plastic deformation on the evolution of wear and local stress fields in fretting. *International Journal of Solids and Structures* **2016**, *82*, 8.
25. Hu, Z.; Thouless, M.; Lu, W.: Effects of gap size and excitation frequency on the vibrational behavior and wear rate of fuel rods. *Nuclear Engineering and Design* **2016**, *308*, 8.
26. Wang, H.; Hu, Z.; Lu, W.; Thouless, M. D.: The effect of coupled wear and creep during grid-to-rod fretting. *Nuclear Engineering and Design* **2017**, *318*, 11.

27. Du, X.; Doermann, D.; Abd-Almageed, W.: A graphical model approach for matching partial signatures. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* **2015**, 8.
28. Du, X.; Abdalmageed, W.; Doermann, D.: Large-scale signature matching using multi-stage hashing. *Document Analysis and Recognition (ICDAR)* **2013**, 5.
29. Yang, Z.; Tai, J.; Bhimani, J.; Wang, J.; Mi, N.; Sheng, B.: GREM: Dynamic SSD Resource Allocation in Virtualized Storage Systems with Heterogeneous IO Workloads. *35th IEEE International Performance Computing and Communications Conference (IPCCC 2016)* **2016**.
30. Zhong, X.; Bailey, N. A.; Schesing, K. B.; Bian, S.; Campos, L. M.; Braunschweig, A. B.: Materials for the preparation of polymer pen lithography tip arrays and a comparison of their printing properties. *Journal of Polymer Science Part A: Polymer Chemistry* **2013**, *51*, 7.
31. Wang, C.; Zhong, X.; Ruffner, D. B.; Stutt, A.; Philips, L. A.; Ward, M. D.; Grier, D. G.: Holographic characterization of protein aggregates. *Journal of Pharmaceutical Sciences* **2016**, *105*, 12.
32. Cao, Y.; Verian, K. P.: A VEDA simulation on cement paste: using dynamic atomic force microscopy to characterize cellulose nanocrystal distribution. *MRS Communications* **2017**, *7*, 5.
33. Chen, B.; Escalera, S.; Guyon, I.; Ponce-López, V.; Shah, N.; Simón, M.: Overcoming calibration problems in pattern labeling with pairwise ratings: application to personality traits. *Computer Vision–ECCV 2016 Workshops* **2016**, 14.
34. Ponce-López, V.; Chen, B.; Oliu, M.; Corneanu, C.; Clapés, A.; Guyon, I.; Baró, X.; Escalante, H. J.; Escalera, S.: ChaLearn LAP 2016: First Round Challenge on First Impressions-Dataset and Results. *Computer Vision–ECCV 2016 Workshops* **2016**, 19.
35. Zeng, Y.; Xie, Z.; Zou, J.: Hydrologic and Climatic Responses to Global Anthropogenic Groundwater Extraction. *Journal of Climate* **2017**, *30*, 20.
36. Wen, R.; Umeano, A. C.; Dhar, S.: Accessing Mitochondrial Targets Using NanoCargos. *Intracellular Delivery III* **2016**, 26.
37. Wen, R.; Umeano, A. C.; Francis, L.; Sharma, N.; Tundup, S.; Dhar, S.: Mitochondrion: a promising target for nanoparticle-based vaccine. *Vaccines* **2016**, *4*, 25.
38. Zhong, X.; Sun, Y.; Kang, C.; Wan, G.: The theory of dielectrophoresis and its applications on medical and materials research. *European Journal of BioMedical Research* **2017**, *2*, 5.
39. Wen, R.; Dhar, S.: Turn up the cellular power generator with vitamin E analogue formulation. *Chemical Science* **2016**, *7*, 9.
40. Wen, R.; Banik, B.; Pathak, R. K.; Kumar, A.; Kolishetti, N.; Dhar, S.: Nanotechnology inspired tools for mitochondrial dysfunction related diseases. *Advanced Drug Delivery Reviews* **2016**, *99*, 18.
41. Zeng, Y.; Xie, Z.; Liu, S.: Seasonal effects of irrigation on land–atmosphere latent heat, sensible heat, and carbon fluxes in semiarid basin. *Earth System Dynamics* **2017**, *8*, 15.
42. Sobolev, K.; Lin, Z.; Cao, Y.; Sun, H.; Flores-Vivian, I.; Rushing, T.; Cummins, T.; Weiss, W. J.: The influence of mechanical activation by vibro-milling on the early-age hydration and strength development of cement. *Cement and Concrete Composites* **2016**, *71*, 10.
43. Wen, R.; Umeano, A. C.: Dual role of nanoparticle for cancer immunotherapy and imaging. *Trends in Immunotherapy* **2017**, *1*.

Global Journals Inc. (US) Guidelines Handbook 2017

www.GlobalJournals.org

FELLOWS

FELLOW OF ASSOCIATION OF RESEARCH SOCIETY IN ENGINEERING (FARSE)

Global Journals Incorporate (USA) is accredited by Open Association of Research Society (OARS), U.S.A and in turn, awards "FARSE " title to individuals. The 'FARSE' title is accorded to a selected professional after the approval of the Editor-in-Chief /Editorial Board Members/Dean.

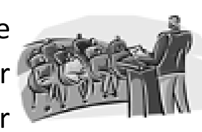
- The "FARSE" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSE or William Walldroff, M.S., FARSE.

FARSE accrediting is an honor. It authenticates your research activities. After recognition as FARSE, you can add 'FARSE' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, and Visiting Card etc.

The following benefits can be availed by you only for next three years from the date of certification:

FARSE designated members are entitled to avail a 40% discount while publishing their research papers (of a single author) with Global Journals Incorporation (USA), if the same is accepted by Editorial Board/Peer Reviewers. If you are a main author or co-author in case of multiple authors, you will be entitled to avail discount of 10%.

Once FARSE title is accorded, the Fellow is authorized to organize a symposium/seminar/conference on behalf of Global Journal Incorporation (USA).The Fellow can also participate in conference/seminar/symposium organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent.

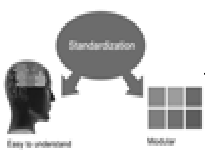


You may join as member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer. In addition, it is also desirable that you should organize seminar/symposium/conference at least once.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The FARSE can go through standards of OARS. You can also play vital role if you have any suggestions so that proper amendment can take place to improve the same for the benefit of entire research community.

As FARSE, you will be given a renowned, secure and free professional email address with 100 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.



The FARSE will be eligible for a free application of standardization of their researches. Standardization of research will be subject to acceptability within stipulated norms as the next step after publishing in a journal. We shall depute a team of specialized research professionals who will render their services for elevating your researches to next higher level, which is worldwide open standardization.

The FARSE member can apply for grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A. Once you are designated as FARSE, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website https://associationofresearch.org which will be helpful to upgrade the dignity.

The FARSE members can avail the benefits of free research podcasting in Global Research Radio with their research documents. After publishing the work, (including published elsewhere worldwide with proper authorization) you can upload your research paper with your recorded voice or you can utilize chargeable services of our professional RJs to record your paper in their voice on request.

The FARSE member also entitled to get the benefits of free research podcasting of their research documents through video clips. We can also streamline your conference videos and display your slides/ online slides and online research video clips at reasonable charges, on request.

The FARSE is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSE can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSE member can decide its price and we can help in making the right decision.

The FARSE member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.

MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN ENGINEERING (MARSE)

The ' MARSE ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The “MARSE” is a dignified ornament which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., MARSE or William Walldroff, M.S., MARSE.

MARSE accrediting is an honor. It authenticates your research activities. After becoming MARSE, you can add 'MARSE' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

The following benefitscan be availed by you only for next three years from the date of certification.

MARSE designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSE, you will be given a renowned, secure and free professional email address with 30 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The MARSE member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

Once you are designated as MARSE, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.

Auxiliary Memberships

Institutional Fellow of Open Association of Research Society (USA)-OARS (USA)

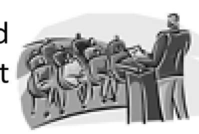
Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as “Institutional Fellow of Open Association of Research Society” (IFOARS).

The “FARSC” is a dignified title which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as “Institutional Board of Open Association of Research Society”-(IBOARS).

The Institute will be entitled to following benefits:

The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA)
The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.
The author fees of such paper may be waived off up to 40%.



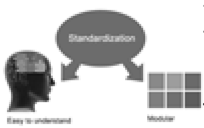
The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.

The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of “Open Association of Research Society, U.S.A (OARS)” so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.



After nomination of your institution as “Institutional Fellow” and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

Other:

The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

"

- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

Process of submission of Research Paper

The Area or field of specialization may or may not be of any category as mentioned in 'Scope of Journal' menu of the GlobalJournals.org website. There are 37 Research Journal categorized with Six parental Journals GJCST, GJMR, GJRE, GJMBR, GJSFR, GJHSS. For Authors should prefer the mentioned categories. There are three widely used systems UDC, DDC and LCC. The details are available as 'Knowledge Abstract' at Home page. The major advantage of this coding is that, the research work will be exposed to and shared with all over the world as we are being abstracted and indexed worldwide.

The paper should be in proper format. The format can be downloaded from first page of 'Author Guideline' Menu. The Author is expected to follow the general rules as mentioned in this menu. The paper should be written in MS-Word Format (*.DOC,*.DOCX).

The Author can submit the paper either online or offline. The authors should prefer online submission.Online Submission: There are three ways to submit your paper:

(A) (I) First, register yourself using top right corner of Home page then Login. If you are already registered, then login using your username and password.

(II) Choose corresponding Journal.

(III) Click 'Submit Manuscript'. Fill required information and Upload the paper.

(B) If you are using Internet Explorer, then Direct Submission through Homepage is also available.

(C) If these two are not conveninet , and then email the paper directly to dean@globaljournals.org.

Offline Submission: Author can send the typed form of paper by Post. However, online submission should be preferred.

MANUSCRIPT STYLE INSTRUCTION **(Must be strictly followed)**

Page Size: 8.27" X 11'"

- Left Margin: 0.65
- Right Margin: 0.65
- Top Margin: 0.75
- Bottom Margin: 0.75
- Font type of all text should be Swis 721 Lt BT.
- Paper Title should be of Font Size 24 with one Column section.
- Author Name in Font Size of 11 with one column as of Title.
- Abstract Font size of 9 Bold, "Abstract" word in Italic Bold.
- Main Text: Font size 10 with justified two columns section
- Two Column with Equal Column with of 3.38 and Gaping of .2
- First Character must be three lines Drop capped.
- Paragraph before Spacing of 1 pt and After of 0 pt.
- Line Spacing of 1 pt
- Large Images must be in One Column
- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
- Numbering of Second Main Headings (Heading 2) must be in Alphabets, Italic, and Font Size of 10.

You can use your own standard format also.
Author Guidelines:

1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

Journals Inc. (US) are being abstracted and indexed (in process) by most of the reputed organizations. Topics of only narrow interest will not be accepted unless they have wider potential or consequences.

2. ETHICAL GUIDELINES

Authors should follow the ethical guidelines as mentioned below for publication of research paper and research activities.

Papers are accepted on strict understanding that the material in whole or in part has not been, nor is being, considered for publication elsewhere. If the paper once accepted by Global Journals Inc. (US) and Editorial Board, will become the copyright of the Global Journals Inc. (US).

Authorship: The authors and coauthors should have active contribution to conception design, analysis and interpretation of findings. They should critically review the contents and drafting of the paper. All should approve the final version of the paper before submission

The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

1) Substantial contributions to conception and acquisition of data, analysis and interpretation of the findings.

2) Drafting the paper and revising it critically regarding important academic content.

3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

Acknowledgements: Contributors to the research other than authors credited should be mentioned under acknowledgement. The specifications of the source of funding for the research if appropriate can be included. Suppliers of resources may be mentioned along with address.

Appeal of Decision: The Editorial Board's decision on publication of the paper is final and cannot be appealed elsewhere.

Permissions: It is the author's responsibility to have prior permission if all or parts of earlier published illustrations are used in this paper.

Please mention proper reference and appropriate acknowledgements wherever expected.

If all or parts of previously published illustrations are used, permission must be taken from the copyright holder concerned. It is the author's responsibility to take these in writing.

Approval for reproduction/modification of any information (including figures and tables) published elsewhere must be obtained by the authors/copyright holders before submission of the manuscript. Contributors (Authors) are responsible for any copyright fee involved.

3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be uploaded via this online submission page. The online submission is most efficient method for submission of papers, as it enables rapid distribution of manuscripts and consequently speeds up the review procedure. It also enables authors to know the status of their own manuscripts by emailing us. Complete instructions for submitting a paper is available below.

Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.

To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications

Research letters: The letters are small and concise comments on previously published matters.

5.STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and to make suggestions to improve briefness.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

Title: The title page must carry an instructive title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) wherever the work was carried out. The full postal address in addition with the e-mail address of related author must be given. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining and indexing.

Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

Tables, Figures and Figure Legends

Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

Preparation of Electronic Figures for Publication

Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.

Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.

6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

6.1 Proof Corrections

The corresponding author will receive an e-mail alert containing a link to a website or will be attached. A working e-mail address must therefore be provided for the related author.

Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

www.adobe.com/products/acrobat/readstep2.html. This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

Proofs must be returned to the dean at dean@globaljournals.org within three days of receipt.

As changes to proofs are costly, we inquire that you only correct typesetting errors. All illustrations are retained by the publisher. Please note that the authors are responsible for all statements made in their work, including changes made by the copy editor.

6.2 Early View of Global Journals Inc. (US) (Publication Prior to Print)

The Global Journals Inc. (US) are enclosed by our publishing's Early View service. Early View articles are complete full-text articles sent in advance of their publication. Early View articles are absolute and final. They have been completely reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after sending them. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the conventional way.

6.3 Author Services

Online production tracking is available for your article through Author Services. Author Services enables authors to track their article - once it has been accepted - through the production process to publication online and in print. Authors can check the status of their articles online and choose to receive automated e-mails at key stages of production. The authors will receive an e-mail with a unique link that enables them to register and have their article automatically added to the system. Please ensure that a complete e-mail address is provided when submitting the manuscript.

6.4 Author Material Archive Policy

Please note that if not specifically requested, publisher will dispose off hardcopy & electronic information submitted, after the two months of publication. If you require the return of any information submitted, please inform the Editorial Board or dean as soon as possible.

6.5 Offprint and Extra Copies

A PDF offprint of the online-published article will be provided free of charge to the related author, and may be distributed according to the Publisher's terms and conditions. Additional paper offprint may be ordered by emailing us at: editor@globaljournals.org .

You must strictly follow above Author Guidelines before submitting your paper or else we will not at all be responsible for any corrections in future in any of the way.

Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

CRITERION FOR GRADING A RESEARCH PAPER (COMPILATION) BY GLOBAL JOURNALS INC. (US)

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals Inc. (US).

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

Index

save our planet

Global Journal of Researches in Engineering

Visit us on the Web at www.GlobalJournals.org | www.EngineeringResearch.org
or email us at helpdesk@globaljournals.org

ISSN 9755861