Foreword and Editorial

International Journal of Computer-aided Mechanical Design and Implementation (IJCMDI)

We are very happy to publish this issue of an International Journal of Computer-aided Mechanical Design and Implementation by Global Vision School Publication.

This issue contains 3 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

In the research paper “An Analysis Study on Tearing Fracture at Bonded Interface of Tapered Double Cantilever Beam with 6° and 8° Using CFRP for Woven Type”, a research area of transportation machine is currently pursuing the means to reduce the gas emission in accordance with the environmental regulation. As reducing the gas emission and increasing the range of electric automotive transportation machines, the weight reduction can be applied. Researches are being carried out with the fiber reinforced plastic (FRP) to reduce the weight of mechanical structures. However, although the extensive range of researches has been conducted on the strength and rigidity of FRP materials, there is inadequate research on the bonding and adhesive types of FRP materials. Bonding method using adhesives is good at FRP materials with the characteristics of these materials. However, there is a lack with the low level of reliability of researches on the adhesive method, and there are difficulties in applying this method in actual industrial fields. In addition, the research on fracture behavior that occurs in the bonded interface takes a long time and many companies are not conducting the researches due to concerns for the trend changes in lightweight materials. In this study, the analytic research on tearing fracture in the bonded interface using TDCB with the gradient angle of 6° was executed. Short-fiber glass fiber reinforced plastic (GFRP) and woven type carbon fiber reinforced plastic (CFRP) were used as the materials for analysis.

In the paper “A Strength Property Study of Notched Tensile Specimen by Material due to the Existence or Non-existence of Crack and Hole”, in machines and mechanical structures, the deformation and fracture due to external forces occurs quite frequently. While the occurrence of fracture at a stress even lower than yield strength can be confirmed in some cases, such deformation and fracture of mechanical structures occur inside the material or is generated by cracks, which causes the stress concentration in not only existing materials but also new materials eventually inducing the deformation and fracture of mechanical structures even in low stress environments. Based on this state, this study was investigated with notched tensile specimen on the durability and strength characteristics of a material with cracks and defects, and this study was performed by 3D design of notched tensile specimens of heterogeneous material having cracks inside with holes. Through the results of this study, the durability and strength characteristics of each tensile specimen model of heterogeneous material could be investigated, and these results as the basic study data on materials having defects along with cracks inside can be applied to the design of mechanical structures.

In the research “A Study on Durability through Structural Analysis by Configuration of Torque Sensor Disk”, MDPS(Motor-driven power steering) can reduce the fatigue of driver by installing the steering wheel with lighter weight and is able to give the sense of manipulation appropriate for the driving condition of vehicle to the driver with more elaborate driving by changing it to feel heavier at higher speed. Accordingly, in this study, the structural analysis due to each of the configurations of torque sensor disk, which is one of the components MDPS, was carried out. The classification of three configurations was based on the number of grooves in the torque sensor disk and the study results were deduced by analyzing three models comparatively. As the analysis results, it was found that the number of grooves affects the equivalent stress and deformation of models and that model 3 has the outstanding structural stability. Therefore, the design factors of torque sensor disk were secured through this study result and it is considered that the torque sensor disk with outstanding structural stability can be developed by using these design factors.

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