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 Press.

This issue contains 5 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 paper "The Study on the Real-Time Measurement of Pipe Shape Applicable during its Bending Process", the importance of piping technologies related to refrigerant, operating fluid, and lubricant is increasing according to growth of the industries such as plant, electric home appliances, aviation, and automotive. The elongation during the bending and curvature change by spring back effect after the bending are caused by characteristics of pipe material. The fault in assembling is occurred by shape change of pipe. So, real-time measurement of pipe shape is required in the bending process. In this study, head for real-time measurement of pipe shape during the pipe bending process in the bending machine is proposed, designed, and manufactured. Verification test of developed measurement head is conducted. Also developed pipe shape measurement head is adopted and tested in the pipe bending machine.

In the research paper "Development of Tofu Processing Machine for 300-Mesh Soybean Micro Powder", Tofu is one of the foods processed using soybeans in Korea, Japan and China that contains vegetable oil and abundant high-quality protein. Tofu production can be done manually or by using technology (machinery). Tofu manufacturing procedures consist of soaking, grinding, filtration, boiling, coagulation, and shaping. Tofu processing itself is also known to greatly affect the taste, quality, and texture of tofu produced. Therefore, in its processing, the process must be considered properly, include the machine used. Tofu production is also generally known still to cause environmental pollution due to waste products produced, okara. Okara causes environmental pollution due to protein damage and loss of water-soluble amino acids. In order to overcome that problem, the development of a tofu processing machine based on soybean micro-powder was carried out in this study. Micro powders were predicted can be used as one of the solutions to remove okara. The tofu processing machine procedures were developed consist of mixing soybean powder, boiling process, coagulation, packing, up to sterilization. The system developed in the machine including the mixing and boiling vessels that are separated to increase the production speed; coagulation device; packing system consisted of plastic pack dispenser, film holder, sealer, cutter, motor and chain; and also sterilization system (at 85°C for 30 minutes). The machine developed in this study did not use a press system like making tofu in general. The result of this study showed that tofu obtained had a softer texture than pressed tofu. This is likely due not only to the omission of the physical pressing process during the manufacturing of tofu, but also to the coagulators used and the content of soluble dietary fibers.

Woobin Sim and Sung-Young Park's paper "Study on Internal Flow Characteristics of Water Flowmeter using Unsteady Computational Fluid Analysis" explored that Computational Fluid Dynamics has been carried out for water flowmeter on this study. Two water flowmeters with different geometry have been modeled through the reverse engineering technique. Flow characteristics and rotation per minute of the blade have been calculated using body interaction function between internal passage of the flowmeter and the blade. As results of flow analysis, the flow momentum of FM1 is more evenly applied compared with that of FM2, which means that the blade of FM1 rotates more uniformly than that of FM2. The flow pattern of FM1 is well distributed from the bottom and middle to top, but that of FM2 shows lack of uniformity. It is believed that the uniformity of rotation is disrupted due to the ununiform momentum delivered on the blade wing. If we assume that the rotational speed is linearly proportional to the inlet flowrate, FM1 has 5.9% and FM2 has 16.8% error. FM1 is superior to FM2 in linearity. These results could be utilized as basic data to design inner structure of the flowmeter and to develop performance.

In the research paper "Experimental Study on Diesel Particulate Filter Strategy for Generator", Environmental substances emitted by diesel engines are fatal to humans. In particular, PM2.5 penetrates deep into the lungs, providing the cause of lung cancer. Recently, the Euro 6 regulation is proposed and regulated to reduce the emission source emitted from automobiles, but due to the increasing number of vehicles, it is only suggested as a temporary measure. Not only the pollution sources emitted from automobiles, but also the increase of fine dust emitted from thermal power generation or fine dust introduced from outside by wind is very serious. In addition, the generation of fine dust in narrow spaces, for example subways, has a serious effect on human activities. Although research and development is conducted to collect such fine dust, it is not easy technology in reality. Currently, the fine dust collection technology is collected through the filter, but the collection performance depends on the pore size of the filter. The smaller the pore size, the higher the collection performance, but seriously affects the engine performance because the back pressure increases. Therefore, it is important to optimize the pore size, structure or material of the filter to minimize the influence on the back pressure. In addition, if the back pressure increases due to the filter, the engine performance is deteriorated, and a regeneration device that removes the collected PM is required. Such a filter regeneration device is an essential device especially for automobile engines. This paper aims to develop a technology to apply metal diesel particulate filter to a heavy-duty diesel engine for commercial generators to secure the optimization technology for occurred backpressure satisfying emissions (PM, CO, HC) environmental regulations for regeneration strategy of diesel particulate filter in near future.

The paper "The Rice Straw Tying Device Parameters Using UG Software to Establish Three-Dimensional Model of Rice Harvest Tying Device Baling Machine" explored that with the improvement of the utilization rate of straws, the recovery question of rice straw has been focused. In the past, the recovery of rice straw needs a lot of manpower. also need to be equipped with a vehicle, most of bundling machine were traction type bundling machine in domestic, secretary was inefficient, this greatly increases the cost of recycling, and the recovery of straw caused two compactions of soil, so that farmers will burn a lot of straw, cause pollution of the environment. Therefore, this study is based on the whole feeding rice combine harvester. added the straw bale device, One-time finished the rice harvesting, threshing cleaning and warehousing and Rice straw compression, bale and other processes. Improve the recovery efficiency of rice straw, reduce the cost of straw recovery, reduced the number of mechanicals going in the fields. In this paper using UG software for the rice harvest tying device baling machine 3 d drawing, and carries on the kinematics simulation, the simulation for bundling device compression mechanism motion state laws.

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