Nature and Science

Performance Evaluation of a 15.5 cm Screw Conveyor during Handling Process of Rough Rice (Oriza Sativa L.) Grains

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Abstarc :

In the current research, some experiments were conducted to investigate the effect of screw diametric clearance and screw rotational speed on the performance characteristics of a screw conveyor, during handling process of rough rice grains. The performance specifications were evaluated in terms of conveyor actual volumetric capacity, volumetric efficiency, specific power and net power requirements. A screw conveyor with the housing diameter of 15.5 cm, screw diameter of 13 cm and screw shaft diameter 3.5 cm having the length of 150 cm was constructed for conducting the experiments. The results revealed that the specific power requirement of the conveyor increased significantly ($P<0.01$) with increasing the screw diametric clearance and screw rotational speed. The net power requirement of the conveyor increased significantly ($P>0.01$) wit increasing the screw rotational speed; whilst the value found to be decreased with increasing the screw clearance ($P<0.01$). As the rotational speed of the screw conveyor increased, the actual volumetric capacity increased up to a maximum value and further increases in speed caused a decrease in capacity. The volumetric efficiency of the screw conveyor decreased significantly ($P<0.01$) with increasing the screw diametric clearance and screw rotational speed. Considering the widely utilization of screw conveyors in agricultural grains handling processes, the information obtained in this study could be very useful in proper design and adjustments of this type of implements with respect to conveying materials characteristics. [Nature and Science 2010;8(6):66-74]. (ISSN: 1545-0740).

Key Word :
Screw conveyor, Power, Clearance, Rotational speed, Volumetric efficiency, Capacity

Volume 8, Number 6, June 2010 , ISSN 1545-0740