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Design, Analysis of Automatic Nylon Rope Cutting Special Purpose Machine

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Abstract: *At present manual rope cutting with poorly designed manual rope cutters leads to many work-related health issues, such as inaccuracy, low productivity and excess time consumption. Consequently, it can lead to a loss of revenue from the time utilized in the process. Acknowledging this issue and the recent developments in automation technology, design and analysis of special purpose automatic rope cutting machine which aims to give high productivity and accuracy is presented in this paper. This special purpose automatic will help in reducing the human error and man power, reliable work done and saving the wastage of rope. It works on the principle of cut to length and feeding mechanism, mainly consists of three processes: tensioning, rolling, and heat-cutting of rope. To increase the tension in rope we use rubber idlers which provide tension along with adequate friction to ensure no-slip condition. The fraying of nylon cut ends is resolved by providing a heater inside the cutter, which provides enough temperature to seal the ends of the rope simultaneously with the cutting process. The machine is PLC controlled, when provided length of rope and no of cycles, machine will run for that particular program and will continue till the program ends. The detailed structural analysis of critical part of this SPM and tool wearing is explored in the paper.*

Keywords: Automatic, High productivity, Nylon Rope, Special purpose machine, Tool life

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