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| **Title:** | Development of a recycling machine for constructing synthetic yarn from plastic waste | | |
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| **Abstract:** |  |
| A major challenge in plastic recycling is to convert plastic waste into a useful product. For this transformation, sustainable technologies such as plastic recycling machines are required. Current technological concepts of plastic recycling are fairly similar. This study aims to develop a small and economical plastic recycling machine to enhance microenterprise by supplying simple equipment for recycling locally processed plastic waste into thread. Starting with a hopper at the input end, the machine incorporates an auger inside a barrel, which is then linked to a metallic perforated mold at the output end. With the help of the system, the plastic flakes melting process is facilitated by maintaining temperatures between 170 °C to 211 °C at equispaced locations of a uniform barrel, while the auger spin enables the flow of molten plastic forward towards the mold.The mold reshapes the liquid plastic into strings of thread. The machine exhibits higher efficiency, reaching approximately 75 % at a decreased screw speed, as low as 28 rpm. It also achieves an average throughput of 156 gm/hour at the lowest specific mechanical energy (SME) consumption. The prototype consumes 1.5 kW for an hour operation. The entire system requires minimal space, making it appealing to individuals with limited financial resources to start a new business venture.  •  A sustainable technology to recycle plastic waste into plastic thread.  •  This optimized, portable and robust system ensures safety and lower operating costs.  •  This system does not require prior knowledge for operation, hence encouraging small entrepreneurs. | |