

## **Modified Design of Flyer with Reduced Weight for Use in Textile Machinery**

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**Abstract :** Textile machinery is one of the fastest evolving areas which has an application of mechanical engineering. The modular approach towards the processing right from the stage of cotton to the fabric, allows us to observe the result of each process on its input. Cost and space being the major constraints. The flyer is a component of roving machine, which is used as a part of spinning process. In the present work using the application of Hyper Works, the flyer arm has been modified which saves the material used for manufacturing the flyer. The size optimization of the flyer is carried out with the objective of reduction in weight under the constraints of standard operating conditions. The new design of the flyer is proposed and validated using the module of HyperWorks which is equally strong, but light weighted compared to the existing design. Dynamic balancing of the optimized model is carried out to align a principal inertia axis with the geometric axis of rotation. For the balanced geometry of flyer, air resistance is obtained theoretically and with Gambit and Fluent. Static analysis of the balanced geometry has been done to verify the constraint of operating condition. Comparison of weight, deflection, and factor of safety has been made for different aluminum alloys.

**Keywords :** flyer, size optimization, textile, weight

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