



Fig. 3 Axial Load, Stress distribution, total deformation, strain distribution

Results

Table 2

Stress, Mpa	Total Deformation, mm	Strain, mm/mm	Safety Factor
51,565	0,06679	0,00072666	5,43

Conclusion

BLDC drone motor with a fixed external rotor shaft has been designed. The rotor's behavior under 2000N axial load was researched that Analyzes are made with these values. For the optimization of the motor design, the loads on the motor should be revised according to the drone design.

Safety factor is kept above 5 for flight safety. Stress and strain are concentrated on the bolt surfaces. To reduce this, the flange connection design may be shape dependent or a larger number of bolts can be used.

Total deformation is highest on the outer diameter of the rotor, the axial movement of the magnets connected to rotor can affect the motor driving and reduce characteristics and reduce the electrical efficiency.

References

1. Keskin O. (2017) Designing of Web-based Lattice Path Controller for Indoor Environment by Using Multiple Quadrotors
2. Andrzej Sikora, Marcin Woźniak. (2021) Impact of Current Pulsation on BLDC Motor Parameters
3. Simons, M. (1994) Model aircraft dynamics. Herts: Argus