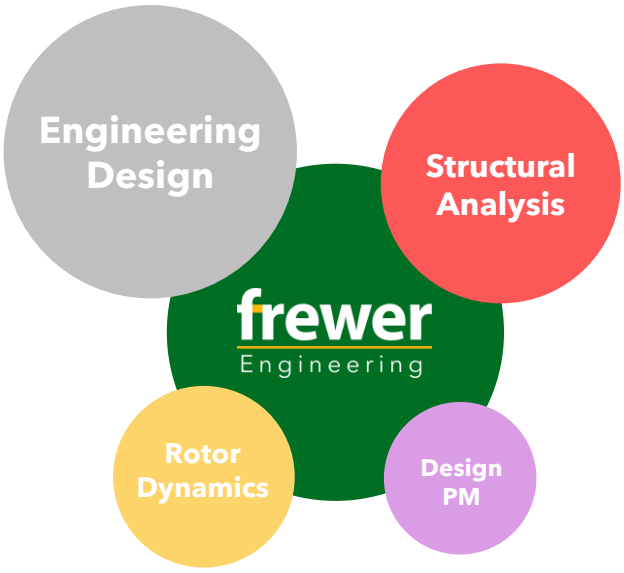
Frewer & Co. Engineers Ltd.
Jayes Park Courtyard
Jayes Park, Ockley
Surrey, RH5 5RR
E: info@frewer-engineering.com
T: +44 (0) 1306 621 321

Case Studies: Single Arm Blade Test Unit

Whilst striving for more efficient flight by using larger and heavier fan blades, our customer required the development of a new single arm blade test unit to test performance under overspeed and bird strike conditions.



Facility Interface & Balancing

The design of the single-arm blade test unit enabled seamless integration into the customer's existing facility, meeting all mechanical and operational interface requirements. An intricate balancing strategy was developed to manage mass asymmetry and dynamic loads, ensuring stable and repeatable performance throughout testing. This approach allowed the unit to operate safely and accurately across the full range of blade test conditions, supporting reliable results and long-term durability of the test setup.

Rotordynamics Assessment

Frewer Engineering's rotordynamic analysis capabilities allowed us to determine mode shapes, forced response, and system deflections using 1D rotordynamic modelling across the full range of rotational speeds. Our engineers used these results to identify critical operating speeds to be avoided during rig operation.

Structural Analysis

Structural analysis was performed for overspeed, blade release, and various bird strike scenarios to ensure sufficient reserve factors across all components, demonstrating that the test unit is suitable for the full range of single-arm tests.