Rotor Dynamics Test Facility

1.0. INTRODUCTION:

Rotor Dynamics Test Facility at AERDC, HAL Bangalore for evaluation
of the functional and operating characteristics of Rotor-Bearing-Support system.

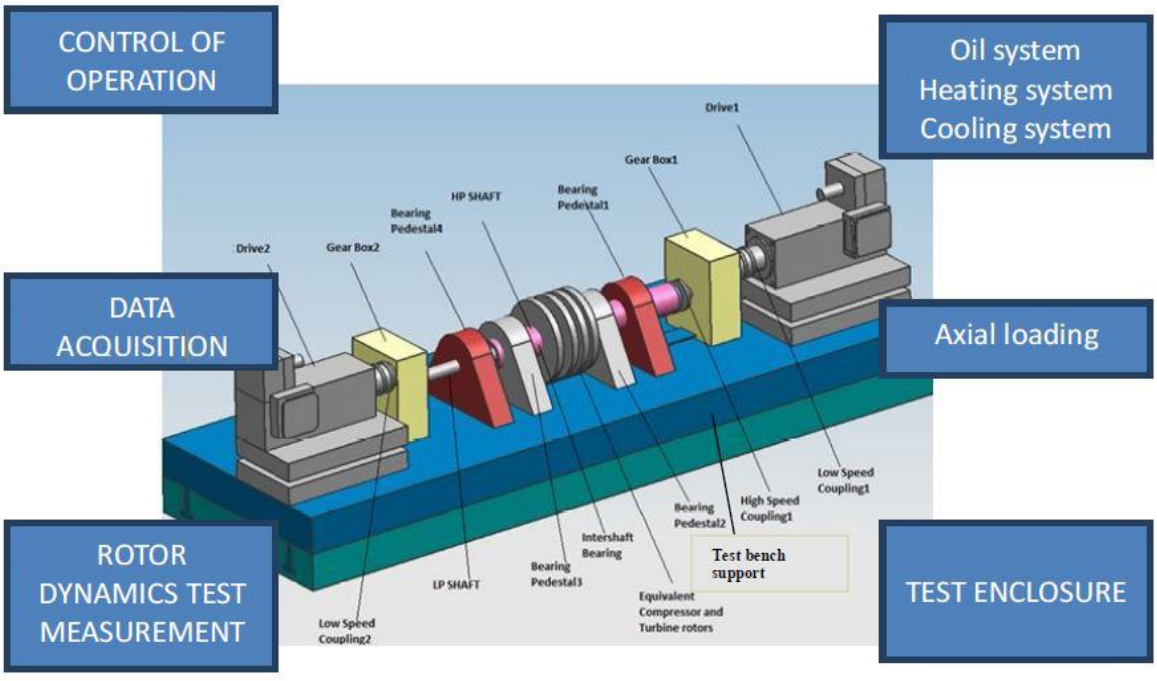
The Rotor Dynamic Test facility covered under this tender includes the design, manufacturing, supply and
commissioning of equipment, systems, software, spares and any other tools if any not explicitly
mentioned in this specification required for the smooth functioning of the facility.

The Building and building related systems to house this facility is not in the scope of supply of vendor.

2.0. DESCRIPTION OF THE TEST FACILITY

2.1. Test set up

The test facility proposed is of generic nature for Rotor Dynamic testing of Rotor-Bearing-support systems
covering various configurations such as both sides over hanging, simply supported, one side over hanging
etc. The schematic representation is given below:



As per the schematic the test facility will comprise of the following

1. Test Bench supporting structure
2. Two drive Systems
3. Two step up Gear Boxes with lubrication system
4. Two low speed couplings and two high speed couplings
5. Four instrumented pedestals
6. Oil system to supply/scavenging oil to/ from Test rotor Bearings
7. Measurement, control and safety system
8. Control console
9. Test specimen - two type
10. Axial loading system
11. Safety enclosure

2.2. Test rotor-bearing support configurations

Based on the test rotor-bearing support configurations in Annexure B the requirements of the facility is as
given below

a) The maximum shaft diameter is 70 mm and the minimum shaft diameter is 15 mm.
b) Maximum weight of rotor is 90 kg and inertia 1 kgm^2 rotor assembly, the maximum Disc diameter will be 750 mm.

c) The Bearing types will be of rolling element type.
d) The supports will be either rigid or flexible type with or without damping. The actual Bearings along with the actual flexible Bearing housings will be tested with variable damping
for Squeeze film or Elastomeric damping.
e) The other support casing elements will be included in the testing for their flexibility either
directly or as equivalent elements as per the test facility design.

3.0. DETAILED SPECIFICATIONS:

3.1. Test Bench Base Structure

i) The Mechanical structure which supports the Rotor-Bearing-Support assembly shall be designed to avoid excitations to the Test specimen in the operating speed range specified in table in Annexure B.

ii) The floor/foot mounted mechanical structure shall be properly isolated from the external
excitations and shall assimilate all the loads transferred from the Rotating system.
iii) The structure shall be separately provided with instrumentation for vibration measurement of
structure and one pair of proximity probes.

iv) The structure shall be optimally designed to save space but meeting all above and other

operational requirements.

3.2. Drive system

The drive system consists of two numbers of drive controllers and motors with the following
specifications.

3.2.1 Drive Controller:

- Type: Variable speed AC drive controllers
- Rating: suitable for 200 kW and 60kW
- Braking: Regenerative with dynamic braking
- Duty: Continuous
- Input supply voltage: 380-415V $\pm$ 10%, 3 phase AC
- Supply frequency: 50 Hz $\pm$ 5%
- Output voltage: Suitable for the selected motor
- Speed feedback: Encoder
- Speed regulation: 0.1% of nominal speed
- Torque accuracy: 3% or better
- Overload capability: 150% for one minute
- Efficiency: 95 to 97% or better
- Type of enclosure: IP 21 or better
- Working environment: 0-45°C, 5-95% relative humidity, 0-1000m altitude
- Make: Siemens, Allen bradly, ABB, Control technic/ reputed
- Max Acc/Dec rate: 100 rpm/s
- Panel: Made up of 2mm thick CRCA sheet steel, floor / wall mounted
- Control Drive and motor shall be integrated with control system through PLC using SCADA program with dedicated operator PC

- Control program: User friendly with safety interlocks, alarms, auto shutdown, manual testing, auto program testing provision etc.
- PLC make: Preferably Siemens/Allen Bradly.