

Lube Oil Console

The turbine is the expensive part. This decides how long it lives.

A FILM A FEW MICRONS THICK

A hydrodynamic journal bearing does not sit in a bath of oil. It rides on a wedge only a few microns deep, generated by the shaft's own rotation, and that film is the entire safety margin - there is no second mechanism underneath and no graceful degradation. Interrupt the supply and the film collapses in seconds, after which a heavy shaft is turning at speed against the bearing shell. That single fact makes the console a CONTINUITY problem rather than a flow-and-pressure problem.

DESIGNED AROUND ITS OWN FAILURES

The useful question is never whether a pump will fail - it will - but what is running three seconds later. A standby starts by itself on falling pressure. An emergency pump runs from the STATION BATTERY, because the most likely reason the duty pump stopped is that the electrical supply stopped, and an emergency pump on the same supply is decoration. On large machines an overhead tank feeds the bearings by GRAVITY through rundown, when everything electrical has already given up - a heavy rotor takes a long time to stop and needs oil for the whole of it. Each layer must fail for a DIFFERENT reason than the one before it, or it is not a layer.

IT HAS TO BE MAINTAINED WITHOUT BEING STOPPED

The console runs between outages, often a year or more, while filters clog, coolers foul and instruments drift on a far shorter timescale. If servicing it requires stopping it, the console has become the item limiting plant availability - the opposite of its purpose. So everything that wears is duplex and is changed over WHILE OIL IS FLOWING. The transfer valve is the most safety-critical fitting on the skid, and is continuous-flow by design - both elements briefly in circuit during the swing - never a selector that passes through a closed position. The standby element is pre-filled and vented first, because swinging onto a dry housing pushes air into the system and drops pressure.

CLEANLINESS AND TEMPERATURE, NOT PRESSURE

Pressure is easy to achieve, easy to measure and is not what wears the bearing out. A particle larger than the film is not stopped by the bearing - it is DRIVEN THROUGH it, scoring the journal or embedding in the softer material, and a population of them recirculating thousands of times an hour shortens bearing life without ever raising an alarm. So cleanliness is specified as a CLASS, reached by flushing and verified by sampling; on most projects flushing is the single largest consumer of commissioning time. Temperature is held as a BAND, not a maximum: too hot thins the film toward contact, too cold will not pass the restrictors at start-up - hence heaters as well as coolers.

THE MACHINE

- Pumping and redundancy - duty, standby, emergency, automatic changeover
- Filtration and temperature - duplex, changed under flow, heaters as well as coolers
- Reservoir and return - residence time, baffling, de-aeration, venting
- Instrumentation, control and protection - changeover logic, trip and permissive

VARIANTS

Turbine lube and control oil console · Mill and gearbox lubrication console · Compressor-train console · Jacking / lift-oil addition for large journals

SCOPE

Ours: console design and integration, pump and redundancy scheme, duplex filtration and temperature control, reservoir sizing for residence time and de-aeration, skid piping and layout, instrumentation, changeover and protection logic, the interface to the protected machine, flushing and cleanliness qualification, installation, commissioning, correlation, training and AMC. Bought-in certified: pumps and drive motors, filter elements and housings, heat exchangers, valves, instruments and control hardware. The customer's: the machine being protected, the oil, the applicable standard and the acceptance programme.

STATUS

Engineered to order. Equipment of this class has been quoted against successive lube oil console requirements for a heavy-engineering power equipment manufacturer; no delivered lube oil console is claimed.