Aircraft Carrier Restraining Gear

It has to be immovable. Then it has to let go.

JUDGED ON THE RELEASE, NOT THE HOLD

The machine is defined by a contradiction: absolutely immovable while the engines run up to full thrust with reheat, then completely released, cleanly, at a commanded instant. Holding is a strength problem with a well understood answer. Releasing while fully loaded is a mechanism problem, and it is the hard one - at that moment every surface is at maximum friction, every clearance is taken up and every component is deflected, yet the release must be complete, symmetric and repeatable.

AND IT MUST HAPPEN WHEN IT IS SUPPOSED TO

A launch is a timed sequence in which several people commit before the release: the pilot has taken the engines up and completed checks, the deck crew have cleared, the signal has been given. A release that drifts with temperature, wear or hydraulic state does not merely lack precision - it removes the sequence's only reference point. Consistency of release timing across hundreds of cycles is a harder requirement than peak holding load.

THEN IT HAS TO DISAPPEAR

Within moments the deck is working again - aircraft taxi over that spot, handling equipment crosses it, crew walk it. So the gear retracts flush and carries deck loads while stowed, drains rather than trapping salt water, and presents nothing that can be caught, tripped over or ingested. It must also work when the deck is not level, where the restraint load is no longer purely along the deck axis - the case a level-floor test never sees.

PROVING IT COSTS MORE THAN BUILDING IT

This cannot be qualified on a bench with a ram. It needs a load frame well beyond service thrust, instrumented so release timing and completeness are measured rather than observed; a cycling programme that repeats the release enough times to expose wear-driven drift; environmental exposure; and finally deck trials. The rig is often comparable in engineering effort to the gear itself, and is offered as a variant in its own right.

THE MACHINE

- Restraint and release mechanism - holding element, release, load path
- Deck integration and retraction - flush stowage, deck loads, drainage
- Hydraulic power and actuation - marinised, accumulators, fail-safe
- Control, interlock and indication - engagement positively confirmed

NOT TO BE CONFUSED WITH

Arresting gear STOPS an aircraft that must not keep moving. Helicopter traversing and handling equipment SECURES and MOVES a helicopter from touchdown to stowage. This HOLDS an aircraft that is about to move deliberately. Same vocabulary, three different machines.

SCOPE

Ours: mechanism design and release behaviour, load path and deck-structure interface, retraction and flush stowage, marinised hydraulic power and actuation, control, interlocks and state indication, the qualification rig and test programme, installation, commissioning, deck trials support, training and AMC. Bought-in certified: hydraulic pumps and valves, seals, sensors, control hardware, certified fasteners and forgings. The customer's: the aircraft and its thrust and interface data, the deck and its structure, and the launch procedure.

STATUS

Engineered to order. Equipment of this class has been quoted against an aircraft carrier restraining gear requirement for a navy; no delivered restraining gear is claimed.