

# THE DAMAGING EFFECT OF TORSIONAL LOADS ON CARGO HOOKS

Towards the end of 2020, the CAA became aware that several cargo hooks had become damaged due to torsional<sup>1</sup> loads.

Rotor and Wing in Taupō submitted a flurry of defect reports to both the CAA and the hook's manufacturer, Onboard Systems.

The CAA published a continuing airworthiness notice – 05-014 *Onboard Systems Cargo Hooks – New inspections for hooks used for torsional load applications*. This advised that loads attached to a cargo hook with a spreader bar (such as a fertiliser bucket) may cause the cargo hook to be subjected to high torsional loads which could damage the cargo hook.

Rotor and Wing reported to Onboard Systems, that, “If the spreader bar reacts against the load beam, the torsion is carried through the side plates to the armor plate bolt, which is the only bolt in the hook that can carry a shear load. The side plate is weak in the area of the armor plate, and cracks due to the twisting that results from the shear load on the bolt. The torsion on the load beam pivot pin would tend to loosen it in the load beam, and the torsion on the hook would tend to spread the side plates apart. This will tend to pry the pin out of the load beam, and also damage the bearings”.

Onboard Systems responded by adding to its component maintenance manual, recommendations of additional inspections of the cargo hook, certain on-condition repairs, and/or appropriate replacement actions to its component maintenance manual. (See CMM document

After repeated instances of damage to hooks carrying spreader bars, defect reporting has encouraged the manufacturer to recommend extra checks.

number 122-015-00, section 4.5 15 December 2020 at [onboardsystems.com](http://onboardsystems.com).)

Chief engineer of Rotor and Wing John Hobday says while the additional inspections should prevent further damage and safety issues, they don't fix the basic problem of the hooks and attachments becoming damaged in the first place.

“The fertiliser buckets over time have larger engines, high impeller RPM and larger diameter impellers, all leading to increasing torsional forces.

“There is experimental work going on around isolation units, however, and this work is aimed at eliminating these forces from impacting on the cargo hook.” ➤

## // ROPES AND STROPS ADVICE

To view the 2019 ropes and strops presentation, “Inspections and safe use of lifting equipment”, go to [aviation.govt.nz](http://aviation.govt.nz) > **safety** > **safety advice** > **helicopter safety**.

<sup>1</sup> “Torsion is a twisting effect on something such as a piece of metal”.  
*Collins Dictionary*.

