

External Loads – How Much Do You Really Know?

There have been 20 accidents – five fatal – involving external load work in New Zealand since 1990. Poor preparation, or poor rigging of the load, has been a major factor in many of those.

Increasingly concerned over the number of incidents and accidents involving external loads, the CAA wants to make operators more aware of the hazards of such work.

“In many operations, external load rigging has been passed down from one generation to the next with little real understanding of the type of rigging equipment that should be used, or how that load is best rigged for that flight,” says Pete Gordon, CAA inspector of helicopter flight operations.

“The Kiwi can-do attitude sees loads being prepared using trial and error. In 2016, there were 18 reported occurrences. As an industry, we need to improve external load safety.”

In late June 2016, the CAA hosted two seminars led by Mike Gelskey Jnr, a Los Angeles-based sling fabricator.

“Many folks doing external load work don’t really understand the limitations of the equipment,” says Mike. “Or they don’t appreciate the importance of frequent inspections of that

equipment, or take into consideration characteristics of the load that may result in an unsafe flight.

“So someone might take old, no longer really fit-for-purpose rigging and put it back in the active inventory to be used again.

“Or someone might take a brand new sling out of the box, rig it inappropriately, and damage it during the first use.

“Or slings that are 10 or 15 years old continue to be used time and again, without inspection, because ‘they’ve always been fine’.

“So incidents and accidents arising from those sorts of situations are sometimes not only about quality of equipment, but also about the lack of training in, and knowledge of, the equipment being used.”

Mike is emphatic that an operator carries out three stages of inspection of all external load equipment.

“The inspection process is critical, because the cost of failure resulting from the use of damaged equipment is too great,” he says.

The initial stage is done when the goods arrive.

“Make sure the correct goods have been received, that they pass muster for your needs, that no damage was done during shipping, and that there are no defects in materials or workmanship.

“The sling capacities and other sling tag information must also be checked to make sure they comply with the specifications published by the manufacturer.

“The second, or ‘frequent’, stage is before each lifting operation. It should be done by people who are competent and responsible.”

Mike says the third, or ‘periodic’, stage is done by people specifically trained to do a very thorough inspection of all surfaces and components.

“At a minimum, a periodic inspection must be done annually for long lines in normal service conditions. The check should be done in a well-lit environment with good ergonomics, ie, working on a table top, where a 100 ft line is examined – about six feet at a time – for anomalies.



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"The printed specs are beside the inspector, as are removal from service criteria.

"All three stages of inspection working together are an important part of all successful load handling activities."

Chief Pilot of Helicopters Hawkes Bay, Jimmy Guerin, says inspecting equipment before each use was one of the most significant things he learned from Mike.

"I took annual checks for granted. But it hadn't occurred to me to check equipment again before using it. But anything could have happened during storage after its annual check and before you use it again. The person storing it could have run a trolley over it, vermin could have damaged it. What Mike taught us about those regular checks really punched home how careful you have to be."

Mike also stresses that rigging should be treated as a 'consumable'.

"Synthetic rigging is not as robust as rigging made from chain and cable. In comparison with metal load handling devices, synthetics are less likely to damage the load.

"All rigging needs to be inspected regularly and the pilot and ground crew all need to be aware of possible damage from UV light and/or chemical degradation and shock loading.

"That's especially true of synthetics. They're beautiful to an aging workforce because they're lighter and easier to handle. They make a very ergonomic tool. But they're sensitive to sunlight, cutting, heat and abrasion.

"In land-based lifting operations in the United States, about 70 per cent of accidents involve the cutting of synthetic rigging from contact with damaging edges or surfaces. The edge need not be razor sharp. Enough tension and compression will damage synthetic, wire, and even chain rigging. It's extremely important sling users are aware of the need for sling protection."

"What Mike taught us," says Jimmy Guerin, "is 'if in doubt, throw it out'. If you feel the strops are a bit fragmented, they just don't feel right, trust your instincts and junk them. It's worth the cost of a new one, not to lose a load through the roof of a brand-new Department of Conservation hut."

"There's a host of other issues that cause accidents," says Mike Gelskey. "And often, it's not just one thing, but a number of factors that group up to create a disaster. It can be improperly calculating the load weight coupled with the use of damaged rigging. Or a load rigged below the centre of gravity with an inadequate number of slings, or an improper hitch configuration combined with gale force winds, causing the load to shift and roll out of its rigging.

"Understanding the dynamics of load handling is one of the most important things an operator can master – the centre of gravity, controlling the load, load-sharing between multiple legs and slings, how multiple legs and slings act, and the evaluation and planning necessary for non-perpendicular lifting and increased tension. Understanding these is critically important for successful flight operations.



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“Operators also need to thoroughly understand what rigging methods best control which loads, and which type of rigging is best for different activities.

“For instance, HMPE – high-modulus polyethelene – fibre has a very low melt point. So not a good choice for fire fighting! Whereas Kevlar has a higher melting point.

“Knowledge like that ultimately allows operators to make better, informed decisions for a safer load handling operation.”

Pete Gordon agrees.

“As a start, operators can be asking their rigging suppliers what to use for which activity, and how to use it properly.”

Jimmy Guerin says one of the ‘light-bulb’ moments for him was Mike’s advice to ‘take charge’ of external load operations.

“Often the person who contracts you will try to be helpful and set up the loads before you arrive.

“But Mike’s advice was to always take a look first. Just because the person contracting you has done a reasonable job stroping up in the past, does not mean that, on this occasion, they have not given the work to someone less experienced.”

Pete Gordon says that with the introduction of Safety Management Systems (SMS) and new health and safety laws, operators are expected to manage the risks in their organisation.

“Clients tend to rely on operators to manage their aviation risks and are increasingly expecting operators to show how they do that.”

The largest single purchaser of commercial helicopter time in New Zealand is the Department of Conservation (DoC).

Its Director of Health and Safety, Harry Maher, says the safety of DoC staff is its highest priority.

“Obviously we want helicopter operators whose loading and flying complies with Civil Aviation Rules, and is in line with best practice.

“But more than that, they need to communicate, fully and frequently, with us, not just that they are doing that, but how they are doing that.

“For instance, working directly with our local staff to agree on who will be supplying the tested and certified lifting equipment, and agreeing on the accountabilities for day-to-day load rigging and management.”

Jimmy Guerin says operators who did not attend Mike Gelskey’s course could find out who did, and contact them about what they learned.

“People in this sector are pretty good at helping one another out, and talking to your peers is one of the best ways of learning.” ■

A Safety Measure

Who would have thought something as innocent as a tape measure could provide a serious safety issue? Here is the account of one workshop manager.

One of our engineers, doing a weight and balance on an aircraft using a particular tape measure, found the figures from a previous weighing did not match those of the more recent weighing.

To get the centre of gravity correct, we had to add 15 lbs of lead to the tail of the aircraft. But that didn’t seem too far from expectation, because a heavier propeller had been installed.

When the same engineer used the same tape measure on another aircraft, he advised the numbers again didn’t make sense, given what he would have expected of an aircraft of that type.

The centre of gravity on the second aircraft was measured again with a different tape, only because it was closer to hand. This time the measurements made sense.

We discovered that the tape we’d used in the first two readings had been sourced from Japan.

It had two separate scales on it: one marked in mm, and the second marked in units of “33/metre” (called a ‘shaku’ and approximately 30.3 cm). It was these units that were mistakenly thought to be 1 inch increments.

The original aircraft was re-weighed and the centre of gravity was found to be still within limits. The weight was removed from the tail and returned to the previous configuration.

The experience highlights the truism that when something doesn’t look right, it probably isn’t. ■



Additional Reading

- » Advisory Circular AC43-13 *Calibration of tools and test equipment for maintenance of aircraft.*
- » SAA/SNZ HB86.2:1998 *Guide to Selection, Care, Calibration and Checking of Measuring Instruments in Industry.*