



Number 30 | February 2009

Quality of Stored Chemical Retardant at Firebombing Bases.

The quality of chemical retardant was raised during the pre fire season aviation briefs.

Recently problems have been identified with the quality of stored chemical retardant at the Bairnsdale firebombing base.

Testing of the stored product showed the salt content reading using a refractometer was at the recommended level. The viscosity of the stored product was significantly lower than the recommended level – to the point where it was not much thicker than water. The stored product had been mixed in the previous 7 days and the viscosity was not increasing with re-circulation.

The effect of this if dropped onto a fire from a SEAT, would see the load break up very quickly in flight and not reach the ground in any effective concentration. So whilst the retarding salt was present in sufficient concentration, there was virtually no thickener present to hold the load together in the air when dropping.

An investigation of the mixing facility found:

- 150 mm of one-year old retardant residue sitting on the bottom of the storage tank; and
- a dead bird was found in the main retardant storage tank; *and*
- the main water storage dam was found to be acidic (low level); *and*
- a nearby septic tank may have leached into the water dam.

Discussions were held with Phoscheck in the USA and they have passed on the following comments:

“...laying around in the bottom of a tank for a year can result in the formation of water on its surface due to evaporation and condensation when the temperature goes up and down during night and day periods.

This water layer will become contaminated by a bacterium that is attracted by the phosphate and the carbohydrate (guar gum thickener). The concentration of bacteria under such a condition during a year of storage can be enormous.

“....I have seen situations at very high bacterial count where the degradation reaction is so fast that the thickener never really thickens”.

BRIEFING NOTE

All gum thickened retardant contains a bactericide which will normally control bacterial infestation. However, bacteria may be introduced into mixed retardant solutions in sufficient quantity of strength that the bactericide cannot control it. The most usual indicator in this situation is the loss of viscosity which results in the colouring agent settling to the bottom of the tank. The salt components are not affected with this reaction.

In the Bairnsdale case, it appears that the bacteria has been prevalent in the retardant storage tank for some time and has transferred into the retardant mixing tank with recirculation. The water quality has added to the problem.

The adding of fresh retardant to cure the problem is a misconception and the problem will continue until the entire system is “shocked” using a solution of sodium hypochlorite. This means treating all hoses, storage/mixing tanks, and plumbing and may include the aircraft which have used the facility.

What this has shown is the quality of stored retardant at Agency facilities must be constantly monitored for **both** viscosity (marsh funnel) **and** salt content (refractometer) to ensure that the product delivered during a firebombing operation will perform as expected in both the air and on the ground.

All firebombing bases (permanent and mobile) must have testing instruments available to ensure retardant quality is checked and maintained. These can be obtained from the Equipment Development Centre at Nth Altona.

Points for the future:

- The quality of all stored retardant needs to be checked asap for the above symptoms.
- “Shock” systems where required.
- The procedures for “shocking” retardant equipment can be obtained from Graeme Briggs, Aviation Equipment Officer.
- The quality of mixed/stored retardant needs to be regularly checked – not just during an operation.
- With eductor technology and the ability to produce high volumes of retardant almost on demand, there is not the requirement to have large volumes of mixed retardant in storage. Recommend 1 phosbin load held in storage.
- This information must be incorporated in the training of retardant mixing crews.

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