15

15

FOREST RESEARCH BRANCH

Stabilization of Slash Fuel Samples

by

S. J. MURARO

FOREST RESEARCH BRANCH CONTRIBUTION No. 642

Reprinted from Fire Control Notes October 1964, Vol. 25, No. 4.

STABILIZATION OF SLASH FUEL SAMPLES[1]

S. J. MURARO, *Research Officer*

Forest Research Branch, Department of Forestry, Canada

Victoria, British Columbia

In fire research, sampling of highly diverse fuels such as slash is difficult, particularly if preservation of the spatial distribution is desired. One method of sampling such fuels is to stabilize them in their original state by using Vibrafoam.[2] It is a rigid polyurethane foam similar in appearance and physical properties to styrafoam.

Vibrafoam is marketed as a two-package viscose liquid; part A contains the prepolymer and part B, the cross-linking agent, catalyst, and blowing agent.[3] Combining the liquids in the ratio of 11 parts B to 10 parts A by weight or 8 parts B to 7 parts A by volume produces a foaming liquid which rapidly hardens to form a porous, white mass. Two quarts, one of part A and one of part B, yield approximately 3.3 cubic feet of foam at a cost of about $10. Larger quantities are available at lower prices.

Small quantities of the two liquids are combined in the appropriate ratios and mixed with an egg-beater or by rapid hand stirring in a polyethylene mixing bowl. (Polyethylene lessens adhesion of solidified foam to the mixing vessel.) Within 1 minute the liquid will expand to form a yellowish froth. This froth is poured through voids in the slash to form a mound of froth at the base of the fuel. Further expansion of the froth incorporates fuel components both vertically and horizontally until the action of the blowing agent is exhausted and hardening commences. This procedure is repeated until a mound of rigid foam incorporates the desired portion of the fuel complex. Safety precautions furnished by the supplier should be observed, especially regarding fume inhalation.

Within 30 minutes the foam solidifies, and a sample (fig. 1) may then be obtained by making four vertical saw cuts along the borders of the desired sample. The complex of Vibrafoam and entrapped slash is easily cut with a handsaw, but if the incorporated fuel components are large, a chain saw may be required. Attempts to cut similar samples of slash without the benefit of a stabilizing medium have been time consuming and difficult.

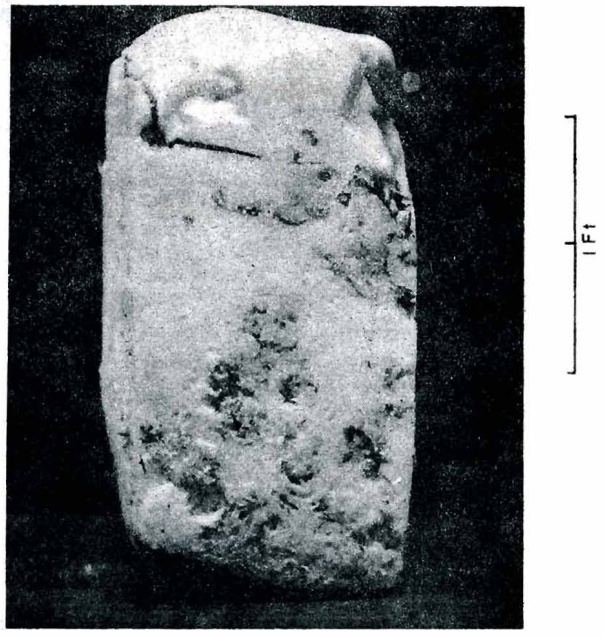

Figure 1.—Fuel sample stabilized with Vibrafoam.

The method of evaluating the incorporated fuels will depend on the fuel information desired. Average density of a fuel sample may be calculated by determining the difference between (a) the density of foam plus incorporated fuel components and (b) the density of an equal volume of solidified foam. The total weight of fuel is the product of the difference in densities and the volume of the sample.

If a finite description of the distribution of fuel sizes and types is desired, the sample may be sectioned to isolate specific zones. Figure 2 shows two facing sections cut from the sample shown in figure 1 and the larger fuel components which were later extracted from the sample.

---

[1] Department of Forestry, Canada, Forest Research Branch Contribution No. 642.

[2] Use of the trade name, Vibrafoam, is solely for information purposes, and endorsement by the Forest Service is not implied.

[3] Anonymous. Naugatuck Chemicals Technical Data Bulletins, P_1, P_2, and P_5, Naugatuck Chemicals, Elmira, Ontario.

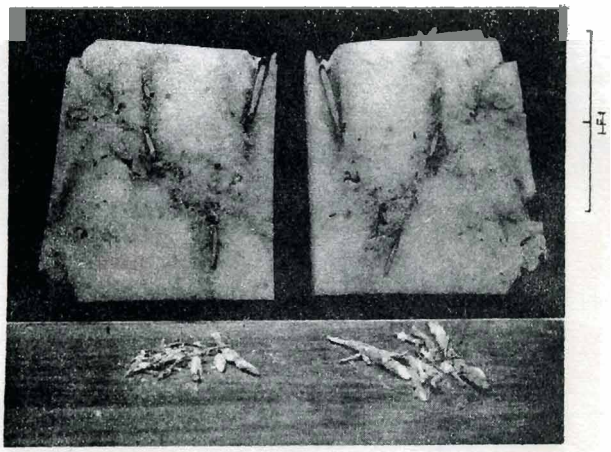

Figure 2.—Adjacent sections of the sample shown in figure 1. The larger fuels taken from each section are shown below.

To allow examination of the incorporated fuels, they must be separated from the foam by breaking the section and removing the larger fuel components by hand. Smaller fuel components, such as needles, grass, and fine twigs, may be separated by dissolving the foam in a solution of equal parts of acetone and dimethyl formamide or in methyl alcohol. Each fuel component can then be dried and weighed to permit a description of the fuel complex in terms of the spatial distribution of weight, or in terms of fuel surface area.