



# FATS AND PROTEINS RESEARCH FOUNDATION, INC.

3150 DES PLAINES AVENUE • DES PLAINES, ILLINOIS 60018  
(5 MINUTES FROM CHICAGO'S O'HARE AIRPORT)

TELEPHONE AREA CODE 312 827-0139

"THE DIRECTOR'S DIGEST"

D. M. Doty

Technical Director

March 21, 1967

No. 33

## FATS AND DERIVATIVES FOR CONCRETE

There has been great interest in materials developed by FPRF research for use in concrete construction and manufacture. Because of this interest we have set up a contract with Battelle Memorial Institute to conduct a market survey to determine more accurately the need and demand for these products in the concrete construction field.

As the result of rather extensive publicity on trichlorosilanated tallow (TCST) as a water repellent coating material for concrete more than 200 enquiries have been received by Battelle Memorial Institute and the FPRF office. Several companies, both in this country and abroad, are interested in obtaining a license from FPRF to manufacture and distribute this material. Final negotiations with these companies will probably not be completed until after the market survey has been finished by Battelle Memorial Institute. It is expected that the results of the survey will confirm the original estimate of the potential market for the material. If this is the case a new market for 40-50 million pounds of tallow annually will result; in addition FPRF will receive sizable royalty payments from licensing agreements; this will enable us to expand our research program.

The Robert W. Hunt Company has forwarded a preliminary report on their tests on 9-carboxystearic acid (9-CSA) as an air-entraining agent for concrete. You will recall that this is another fat-derived compound studied by Battelle Memorial Institute. The results from the Robert W. Hunt Company (Table 1) show that air-entrained concrete using 9-carboxystearic acid meets the ASTM specifications. We have been advised by competent patent attorneys that it is very unlikely that we could obtain a patent on the use of 9-carboxystearic acid as an air-entraining agent for concrete. However, Battelle staff members are preparing a technical paper on their studies, and this should stimulate interest in its use. At least one major chemical producer is already interested in producing and distributing the material. Again, the market survey should more clearly define the potential market which has been estimated at 10 million pounds annually.

Table 1. Performance of Air-Entraining Agents in Concrete

Test	No Additive	Commer- cial Admixture	9-CSA	Specification Requirements
Air Content(% vol.)	1.77	5.30	5.90	
Bleeding	2.21	1.18	1.14	< 3.18
Comp. Strength-psi				90% of reference
3 days	2323	2164	1956	1948
7 days	3454	3189	2995	2870
28 days	4840	4444	4221	4000
Flex. Strength-psi				90% of reference
3 days	379	350	364	315
7 days	482	466	471	419
28 days	660	647	629	582
Freeze-Thaw Resistance				
Durability - %	13.5	83.1	80.4	80.0
Bond Strength-psi	257	307	297	> 276
Length change	-0.013	-0.023	-0.020	< -0.028

A recent report from R. L. Johnson shows that the fat-inorganic admixture that he has developed under contract with FPRF can be prepared in paste form containing about 70% solids(21% fat). This paste used at a level of only 0.25% fat(based on the weight of Portland cement)gave greatly improved workability, strength and water resistance to concrete. This is a product that can be produced and marketed by renderers. The conditions under which interested companies can obtain a license from FPRF to produce and market this product will be established soon. As for TCST and 9-CSA, the Battelle market survey will help to more clearly define the potential market for the material. Preliminary estimates suggest that at least 100 million pounds of animal fat will be required to meet the probable yearly demand for the material if actual field trials confirm the laboratory tests.

It is almost certain that one or more of these materials will ultimately find extensive usage in the concrete construction field. If this occurs it demonstrates again that research can develop new outlets, new markets, for renderers products.