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Compounding Materials Used in the Rubber Industry

(Classification and Health Hazards)

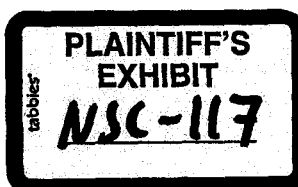
Part 1—Accelerators, Anti-Oxidants, and Dry Organic Compounds

Industrial Safety Series No. Ru. 1

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This pamphlet is a compilation of experience in accident prevention. It must not be confused with Federal, State or insurance requirements, or with National Safety Codes.



1. The more obscure any hazard, the more insidious and dangerous it is, especially if it be of a type to slowly affect one's health. This slow burrowing from within is to be feared—its presence is often unknown until irreparable damage has been done or even death occurs. There are many hazards of the latter type still present today in industrial processes. (See note 1.)

2. Many substances are in use which neither the manufacturer nor the consumer recognizes as hazardous. This is especially true in smaller industries where technical advice or medical service is lacking. These substances are to be feared and rightly so inasmuch as contact with, or improper handling of them may cause a slow breaking down of the body structure which cannot be corrected if allowed to continue for too long a period.

3. These are the problems to which we must turn our attention. Much good work has been done but there is still more to do. It is a process of investigation and education. We must first ferret out these insidious substances and educate both employer and employee how to handle them with safety.

4. The rubber industry is one in which many and varied types of compounds are used. An inventory would probably reveal several hundred different compounds in use for compounding rubber, many of them in quite general use. Among this large number we know that some are very dangerous to the health of those handling them unless precautionary measures are taken. There are others about which comparatively little is generally known. Some manufacturers are apparently ignorant of the properties,

toxic or otherwise, of many of the substances they are using. With the increasing use of organic substances for vulcanizing rubber there is an ever present danger of health hazard unless the toxic and irritating properties of these substances are known.

5. There is a tendency for some manufacturers of chemicals to place rubber accelerators and compounding ingredients upon the market under fancy trade names. It is a practice to be discouraged and the producer should state the exact chemical nature of the compound. If he is unwilling to do this, he should at least stand back of his product and guarantee it to be free from toxic and all other properties injurious to one's health.

6. The manufacture of rubber while requiring heavy machinery and the use of many and varied chemicals,

should be no more hazardous than any other line of manufacturing where heavy machinery is involved. In fact, it should be and can be made less hazardous than many lines of manufacturing if proper precautions are taken. The machinery used is mostly slow moving compared to many industries and is adaptable to being well protected to safeguard the operatives.

7. The chemicals used can all be handled in a safe manner provided their toxic and chemical properties are understood and efficient methods of handling are employed. Many poisonous chemicals used in the past are fast being replaced with non-poisonous compounds and there is no reason why the manufacture of rubber goods cannot be carried out under the safest and most healthful conditions.

8. It is with the hope of stimulating more interest along these lines that this pamphlet has been prepared. Until recently there has been a lack of definite data concerning many of the compounds used in the rubber industry. At best, information pertaining to their nature is widely scattered and in many cases very meager. In a few outstanding instances the ground has been very well covered especially in the handling of certain lead compounds and benzol. The splendid work done jointly by the Rubber and Chemical Sections of the National Safety Council on Benzol is an excellent example of what can be done to educate the manufacturer in the proper handling of these chemicals so as to prevent injury to those using them.

9. This and the subsequent pamphlets of the same series is a classification and description of the nature of the various compounds used in rubber manufacture. The rubber compounds have been divided into four groups and

REFERENCE PAMPHLETS

Additional information of value will be found in other Safe and Health Practices Pamphlets issued by the National Safety Council, complete sets of which may be secured as desired. Special reference is advised to the following:

- No. 16. Protective Clothing.
- No. 22. Industrial Shop Lighting.
- No. 27. Drinking Water, Wash and Locker Rooms.
- No. 29. Electrical Equipment in Industrial Plants.
- No. 32. Exhaust Systems.
- No. 37. Industrial Ventilation.
- No. 45. Industrial Housekeeping.
- No. 52. Static Electricity.
- No. 60. Chemical Laboratories.
- No. 64. Respirators, Gas Masks and Breathing Apparatus.
- Chem. 1. Pipe Lines and Tanks as Causes of Accidents.
- Chem. 3. Chemical Burns, Their Nature and Treatment.
- H. P. 10. Skin Affections.
- H. P. 14. Benzol.

ert clay base. It is a fine gray to yellowish white powder having a slight not unpleasant organic odor. It has a specific gravity of approximately 2.00. It is decomposable upon heating.

227. **Uses**—The material was developed for use as a rubber accelerator. It is very active at low vulcanizing temperature and is very difficult to handle on mixing mills without scorching of the rubber. Due to this difficulty it has not found extensive use in the rubber industry. Its use is confined largely to specialties and vulcanizing cements.

228. **Health Hazards**—This accelerator is non-poisonous and causes no disagreeable or harmful fumes during mixing. No ill effects from its use have been reported. (Sub-group 4.)

Zinc Salt of Dithiofuroic Acid

229 For information on this compound see data given under Furac No. 2. (Sub-group 4.)

ACKNOWLEDGMENT

This pamphlet was revised by L. J. D. Healy, technical superintendent of The Fisk Rubber Company, Cudahy, Wisconsin. The substance of the original pamphlet was prepared from a paper given by Mr. Healy before the Rubber Section during the Sixteenth Annual Safety Congress (1927). This revision includes additional material from papers presented by Mr. Healy before the Rubber Section during the Seventeenth and Eighteenth Annual Safety Congresses (1928 and 1929). The National Safety Council is indebted to Mr. Healy and the Executive Committee of the Rubber Section, under whose direction the pamphlet was prepared.

NOTES

1. Rubber Section Transactions of the 1927 National Safety Congress.
2. Hamilton, "Industrial Poisons in the United States," 1925, p. 432.
3. Hamilton, "Industrial Poisons in the United States," 1925, p. 510.

4. U. S. Bureau of Labor Statistics—Bulletin 179—"Industrial Poisons Used in the Rubber Industry."
5. Hamilton, "Industrial Poisons in the United States," 1925.
6. Kober and Hayhurst—"Industrial Health," 1924.
7. Shepard and Kraile, "Journal of Industrial Hygiene," 1920-21, Vol. 2, p. 33.
8. Kratz, I. R., "World," 1917, Vol. 57, p. 146.
9. Hamilton, "Industrial Poisons in the United States," 1925, pp. 432, 434, 524 and 528.
10. Hamilton, "Industrial Poisons in the United States," 1925, p. 506.
11. "Journal of Industrial and Engineering Chemistry," 1918, p. 865.
12. Hamilton, "Industrial Poisons in the United States," 1925, p. 502-524.
13. Curt Gerdon, Zentralbl. f. Gewerbehyg. 1920, VIII, p. 183.
14. Olsen, J. A. M. A., 1916, p. 66, 864.
15. Hamilton, "Industrial Poisons in the United States," 1925, p. 528.
16. Hamilton, "Industrial Poisons in the United States," 1925, pp. 491, 497, 506.
17. Hamilton, "Industrial Poisons in the United States," 1925, p. 525.

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