The Major Considerations in the Problem of Package Weight Control

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Since the passing of the 1958 Amendment to the Federal Food, Drug, and Cosmetic Act there has been increased activity in all areas coming under the jurisdiction of the Food and Drug Administration. One of these areas is concerned with the proper labeling of food packages which includes the specific question as to whether or not the package contains the weight or measure as shown on the label. This is of particular interest to the beet sugar industry. It should be, for almost 27 million bags (cwt) of beet sugar were sold in packages in 1960, which was 67 percent of the total beet sugar sales (1)[2].

The increased activity in this field by the FDA has been paralleled by the regulatory agencies of most states and some of the larger municipalities.

All this is not the result of pressure from a suspicious public, but rather an honest attempt on the part of those charged with the protection of the consumer to meet the increasing complexities of the job. As reputable manufacturers, we must welcome this emphasis on proper package weight control as an opportunity to prove to the consumer that he is getting full value when he purchases our products.

Regulating Agencies

The role of the FDA in connection with package weights has already been mentioned. It is of interest to examine the authority of this agency which has jurisdiction over weights of food packages moving in interstate commerce.

The Federal Food, Drug, and Cosmetic Act lists two general categories of acts which are prohibited; namely, adulteration and misbranding. Discrepancies between actual and labeled weight come under the latter category, and the enforcement of the Act is carried out by the FDA.

The Federal Trade Commission also concerns itself with the subject of misbranding, but through agreement, exercises jurisdiction over advertising, leaving the field of labeling to be covered by the FDA (2, 3).

All states have laws governing the proper labeling of commodities in commerce within its borders. In some cases, these are supplemented by ordinances of large municipalities. The department responsible for administering these laws varies among the

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[2] Numbers in parentheses refer to literature cited.

states, although in most cases the Department of Agriculture is assigned the responsibility.

In the opinion of those responsible for carrying out the laws, the problem of packages that are short of the declared weight receives too little attention. This is apparently due to a lack of funds in most cases. To improve this situation, it has been suggested by Mr. George P. Larrick, Commissioner of Food and Drugs, U. S. Department of Health, Education and Welfare, that the FDA commission State officials already engaged in weights and measures handle enforcement work (4). This would be a cooperative effort to gain greater coverage of the problem. In making this suggestion Commissioner Larrick stated, "We would like to see a concerted nationwide effort by the State officials and the Food and Drug Administration to stamp out the shipment of short-weight merchandise."

As an industry involved in selling packaged food items, we can certainly expect to have our products checked more frequently in the future. The results of such checks and our reaction to these results may have considerable influence on consumer confidence in our products.

The Governing Laws

As previously mentioned, the Federal Food, Drug, and Cosmetic Act covers the subject of package weights under the heading of misbranding. The Act clearly specifies that:

a. The label will state the minimum quantity or the average quantity contained, that the term "minimum" must be stated or the label amount shall be considered to express an average quantity.

b. Where the average weight is expressed, which applies to our own case, variations from the stated weight are permitted provided that the variations are unavoidable, and remain within the limits of good packaging practice. Variations will not be permitted, however, to such extent that the average of the quantities of the packages comprising a shipment is below the quantity stated, and no unreasonable shortage in any package shall be permitted even though overages in other packages in the same shipment compensate for such shortage.

The important point is that the FDA allows packages to be filled to an average weight and recognizes the necessity for allowing reasonable variations in the weight of packages. To some this may appear as a loophole, but to properly comply in meeting the average weight without unreasonable shortage closes the door on such a possibility.

The laws of the individual states covering package weights vary widely in detail as would be expected. It is significant to note, however, that at least 47 states, the District of Columbia, and Puerto Rico recognize reasonable variation (5). In this detail, then, there is almost unanimous agreement between the State and Federal regulations.

The 46th National Conference on Weights and Measures (1961) approved a model state law covering labeling, advertising and packaging (6). The conference, composed of representatives from Federal and State agencies as well as trade and industry, took an important step forward in endorsing such uniformity. This model law provides for the declaration of an average net weight and recognizes reasonable variations from the labeled weight. In these details, the model law accurately parallels the existing Federal regulations.

Economic Compliance

Producing packages of proper net weight is a quality control problem, for this is as important a specification to the consumer of our products as are the other quality factors such as color or sediment. Controlling package weights should, therefore, be a function of those normally responsible for quality control. Accepting this principle provides the use of a ready-made technical organization in the company and plant to apply modern techniques for efficient control.

This leads to the crux of the situation—what are the most efficient and economic control procedures available to meet the problem?

Remembering that the legal requirement in packaging is to have the average weight of each shipment equal to or in excess of the label weight with no unreasonable shortage in any package, it is obvious that the target weight at the packaging station must exceed the label weight to some degree in order to be safe. Depending on the degree of security desired, it is also expensive.

Using the concepts of Statistical Quality Control (SQC) the degree of safety can be evaluated against the product giveaway and both controlled within the most acceptable limits according to the judgement of management. SQC is the application of the mathematics of probability to the numerical results of any process, operation, experiment, etc., for the purpose of expressing the true meaning of the results. These techniques are widely used today wherever processing or manufacturing results must be controlled to specifications.

The scope of SQC is tremendous and the subject is well covered from fundamentals to applications in texts and periodicals.

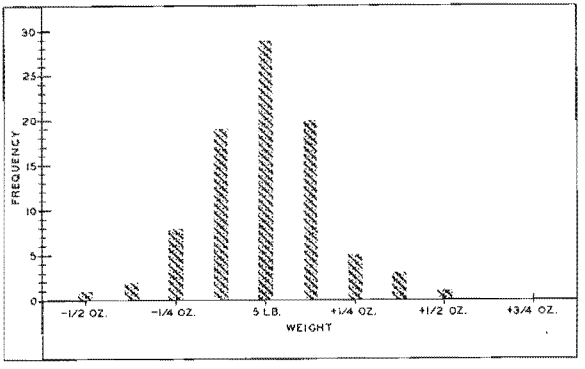

Figure 1.—Weight distribution histogram.

It is not the purpose here to describe detailed techniques of SQC applicable to package weights. However, for those unfamiliar with the subject a brief description of the principles relative to our problem follows:

Suppose a shipment of packages produced at a target weight of 5 pounds net is randomly sampled and checkweighed to the nearest 1/8 ounce. A plot of the individual weights obtained for frequency will present a weight distribution histogram such as shown in Figure 1. This describes mathematically the normal distribution curve covering the variations in weights in the shipment shown in Figure 2. Note that weights center about the target weight but that half of the packages will be less than label weight. Obviously a safety factor should have been included to provide assurance that the shipment would comply with the law.

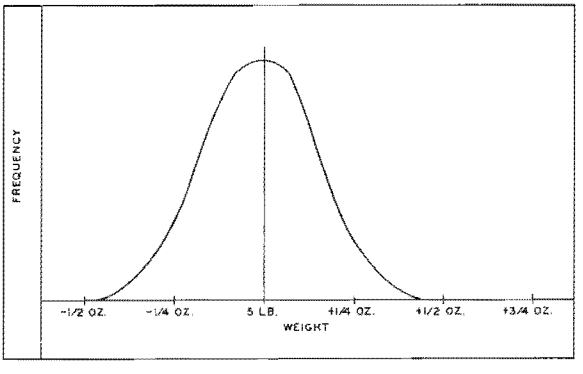

Figure 2.—Normal distribution curve.

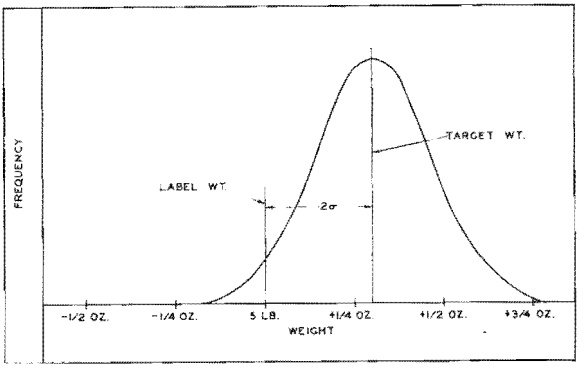

Figure 3.—Assuring compliance.

The standard deviation (designated by the Greek letter sigma) of the sample weights provides a useful guide in adjusting the target weight to gain the required assurance. If 95% assurance is desired that all packages will be at least label weight, then the target weight will be set 2 standard deviations above the label weight. This is depicted in Figure 3. If 99% assurance is desired, the target weight is set 3 standard deviations above the label weight. From these figures it can be seen that SQC provides the necessary assurance that the average net weight of the lot or shipment will be not less than the label weight. It is also obvious that the amount of giveaway product necessary for such insurance will be less by this control than if all scales are kept adjusted to allow nothing less than label weight.

These statistical techniques serve another important purpose in establishing the magnitude of package weight variation. Excess variation requires excess giveaway product to assure the proper net weight average, and increases the danger of shortages at the unreasonable level. When such is indicated, the cause must be located and eliminated or minimized. This may require improvements in weighing equipment, maintenance and, or operation. Figure 4 demonstrates an improved condition.

These statistical concepts along with others have been converted to the tools of SQC. The methods of sampling, recording, calculating, and evaluating have been simplified to the point that the ordinary station operator or foreman can be trained to carry out the entire analysis and take action according to the results. The use of statistical methods will not only insure the most economic compliance with the law, but the resulting records should provide good evidence of intended conformance.

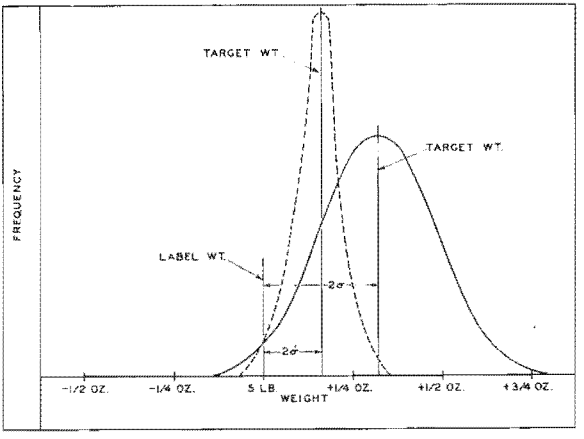

Figure 4.—Compliance at reduced giveaway.

New Trends

Equipment manufacturers now offer a variety of machines designed to aid in the task of package weight control. Among the features offered are 100% checkweighing, automatic rejecting of packages not meeting specifications, and a continuous and permanent record of results. The economic advantages of such equipment lies in the automation of the process and the narrowing of the net weight variation allowing a minimum amount of giveaway product. The latter feature, again, is accomplished through the use of statistical procedures and controls.

Viewing the entire picture of package weight control, it may be said that by proper understanding of the regulations and their enforcement along with an effective weight control program, the increased scrutiny of the enforcement agencies can be successfully and efficiently met. This view is slightly marred by a recent incident relevant to this subject (7).

Early in 1961, the State of California adopted a uniform procedure for its inspectors to follow in checking package weights. This code is based on statistical methods and is designed to cover the average net weight and unreasonable shortage features of the law. At a hearing prior to the adoption of the code, a representative of the California Office of Consumer Counsel objected to the adoption of the code on the basis that it allows reasonable tolerances below the labeled weight. It would seem that in this case the objection should be to the regulation, not to the method of enforcement.

The point to be made on this incident is that here we have a consumer representative opposing the average net weight and reasonable variation concepts and supporting the minimum net weight concept for all food packages. This could be accomplished only by a change in the present Federal and State regulations. However, this offers little consolation in view of the fact that the Federal Government is considering establishing a Department of Consumers (8) which might well support the same view.

A minimum net weight requirement for packages would require excesses of product to be included in packages well above that normally required under the present law for compliance. The beet sugar industry can ill afford to give away a greater amount of sugar.

It is imperative, then, that this industry as well as all food industries whose products are sold in packages not only comply with the existing package weight regulations but also support and defend them against changes and interpretations which do not consider the importance of reasonable variation.

Summary

The increased activities of the FDA in recent years have increased attention to package weights. The regulating agencies involved are the FDA and its counterpart in the states and larger cities.

The Federal Food, Drug, and Cosmetic Act covers the subject of package weights under the heading of misbranding. The Act specifically allows variations from the labeled weight provided that these variations are reasonable and unavoidable, and that the average weight of a lot or shipment is not less than the labeled weight. This concept is supported by the laws of practically all states and the 46th National Conference on Weights and Measures.

Economic compliance with the regulations can best be achieved by Statistical Quality Control. The techniques provide for establishing the safe limits of package weights for the minimum amount of giveaway product. New automatic equipment is now available to assist in reducing labor and product loss.

The possibility exists that consumer representative groups may oppose the accepted average net weight concept in favor of a regulation based on the minimum net weight concept. Such a change would require an increased amount of excess product in the package to assure compliance. It behooves the beet sugar industry to comply and support the present regulations.

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