THESIS

THE INCIDENCE

OF THE

SIMPLIFICATION MOVEMENT

IN

NEW ENGLAND

INDUSTRIES.

By

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Course XV

Massachusetts Institute of Technology

Cambridge, Mass.

1931
Boston, Mass.
May 27, 1931.

Professor A. L. Merrill,
Secretary of the Faculty,
Massachusetts Institute of Technology.

Dear Sir:

In accordance with the requirements for graduation we herewith submit a thesis entitled "The Incidence of the Simplification Movement in New England Industries."

We take this occasion to express our appreciation to Mr. R. M. Hudson, Industrial Executive of the New England Council and to Professor Karl Fernstrom, for their many valuable suggestions. We are also much indebted to Mr. Edwin W. Ely, of the United States Department of Commerce, who gave us much valuable information concerning the subject of simplification.

By request of the Engineering and Business Administration Department, the original questionnaires have been turned over to them.

Respectfully submitted,

Signature redacted

Signature redacted
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NON-ACCEPTORS RESPONDING TO QUESTIONNAIRE

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It may be well to consider first, the commonly accepted explanation of simplification. Simplification is the elimination of those varieties of products which have an uncertain demand, and whose production requires the placing of a higher price upon those articles which have a wide utility. From this definition it is obvious that the purpose of simplification is to eliminate wastes caused by excessive and uneconomic diversity. In this way, greater efficiency in production can be obtained and lower costs of production, distribution, and consumption may be realized. It must be remembered that the advantages behind such a movement do not rest entirely with the producer, since the distributor and consumer both share in the savings incurred through waste curtailment. With a reduction in costs, there will eventually be a reduction in final selling price, which will enable the general public to buy their needs and luxuries at a lower cost. This will, without doubt, be a great factor in raising the standard of living through the avoidance of waste, and not through the
expense of producer or consumer.

In dealing with the subject of simplification, many confuse its meaning with that of standardization. As explained previously, simplification embodies essentially a reduction in number of products, while standardization is a process whereby certain limits are established as to quality, quantity, and value. It is true that standardization may involve some simplification, but each describe a different process. For example, a company is making fifty products and through a sales analysis determines that seventy-five percent of the sales are made on five of the fifty products. The company, therefore, decides to eliminate the forty-five products which constitute only twenty-five percent of their sales. This process is called simplification. Suppose that a group of companies in the same or related industries decide to establish definite limits of shape, quality, etc., for their products. This process would be termed standardization as it involves certain mechanical and physical characteristics of the product. However, if a group of manufacturers agree to simplify their products to a definite number this procedure would then be termed a simplified practice.
Simplification is by no means a new development since the average business man has always made an effort to produce only those products which have the widest market. However, there was little need to organize such a movement in industry until the World War. At that time it was absolutely necessary to increase production in certain lines as quickly as possible, and it was only through the simplification of products and processes that such could be accomplished. Nevertheless, American industry realized the need for such a movement in an organized way during peace times.

In 1921 President Hoover, then Secretary of Commerce, inaugurated the division of simplified practice in the Department of Commerce to carry out this work in a systematic way. This department has made splendid progress during the past ten years in serving as a centralized agency in cooperating with industry. One of its main functions has been the development of simplified practice recommendations, which were initiated by industries throughout the United States. There is no doubt, that without the aid of this department, such recommendations would have had little opportunity to develop.

The above paragraphs were written in an endeavor
to acquaint the reader with the exact meaning and development of simplification and its distinction from standardization.
OBJECT OF THE INVESTIGATION
OBJECT OF INVESTIGATION

The object of this investigation is to determine the incidence of the simplification movement in New England industries. It is also the purpose to determine the degree to which these simplified practices have been accepted and spread throughout New England and the possible benefits which have been derived through the adoption of these practices.

This thesis was written for the New England Council at the suggestion of Mr. Ray M. Hudson, former Chief of the Division of Simplified Practices of the United States Department of Commerce. Mr. Hudson, who was one of the prime instigators of the simplification movement in this country, is now the Industrial Executive of the New England Council. This organization fosters, among other principles of scientific management, simplification, and therefore, they are extremely interested in determining the progress made in this direction.
METHOD OF PROCEDURE
METHOD OF PROCEDURE

This thesis was carried out almost entirely by the use of questionnaires, as the field covered was too wide to permit personal investigation of each individual company.

The first step, therefore, was to compose two suitable questionnaires, one to be sent to acceptors of the Simplified Practice Recommendations as published by the Department of Commerce, and the other to non-acceptors. Assistance was gained in this matter by making a thorough analysis of the problem, and by reading all the available material on the subject of simplification. It was the purpose of the authors in making up the questionnaires to make them as complete, but yet as simple to answer as possible in order that the maximum number of returns could be attained. After preparing the questionnaires they were taken to some of the large and small companies in and around Boston in order to see exactly how they would react towards them. Many helpful suggestions were offered to us during these visits, and our questionnaires were revised accordingly.

After the final questionnaires were set up it was
necessary to make up a list of concerns to whom they should be sent. One list was composed entirely from the acceptors of the Simplified Practice Recommendations which is contained in pamphlets issued by the Department of Commerce. Each of these pamphlets contained the list of simplification measures that have been recommended in certain lines of products, and those who have accepted these recommendations. The list of non-acceptors was obtained from both the "New England Directory of Manufacturers" published by Sampson & Murdock, and the "Thomas Directory of American Industries." Special attention was made in choosing companies of different industries and of different sizes, in order to obtain a more representative opinion.

When the questionnaires were returned the information contained therein was filed on cards. This information was then carefully analyzed in order to facilitate the drawing of conclusions, and the final preparation of the thesis.

Personal interviews were made with executives of the various companies in and around Boston and Cambridge. However, the results of these interviews were not wholly satisfactory because the one interviewed rarely had enough information on hand to answer our questions adequately.
SUMMARY
SUMMARY

THE INCIDENCE OF SIMPLIFICATION

In summary, the greater part of New England manufacturers realize the advantages which may be derived through simplification of their products. Most of the progressive manufacturers have taken definite steps to acquire the benefits which follow this procedure. With these companies, simplification measures are carefully watched, and a constant check maintained against the carrying of "shelf-warming" goods on their inventory. However, not all the manufacturers, who realize the advantages of simplification have adopted simplified practices. There are various reasons for this fact. On the strength of this investigation, the most prevalent reason is that of the anomalousness of the industry to simplification. This may be true in many cases, but there are also many companies giving this reason who have not carefully investigated the problem, and consequently do not recognize the simplification which may be accomplished in their particular line. This statement is a result of the observation that, in many cases, companies in identical industries hold conflicting views on the adaptability of their particular industry to sim-
plification. In several cases, one company replied that the benefits derived through intensive simplification have been most satisfactory, while another company in the same industry wrote that simplification was not practicable. It is highly probable, that the latter company has not analyzed its products with simplification in mind.

Many companies, not adopting simplified practices, do not believe that the present economic depression is a propitious time for the advancement of simplification. It is noted that these views are shared by approximately the same percentage of acceptors and non-acceptors. These concerns feel that they must manufacture any size, shape, or quality of product in order that their factory keep operating. Because of the excessive production and sales costs resulting from this procedure, it is doubtful if any great financial benefit is gained by the diversified manufacturing. Furthermore, diversified practices frequently leads to frozen assets in slow-moving inventories -- the underlying cause of many failures during the present economic crises. The questions of employment, good-will, etc., enter into this problem, but, since they are beyond the scope of this thesis, no
discussion of these factors will be included in this paper.

The Division of Simplified Practice feels that lack of cooperation is one of the greatest obstacles to simplification. However, the number of New England manufacturers who believe that lack of cooperation throughout the industry is sufficient reason for not adopting simplification, is negligible. This applies to both acceptors and non-acceptors of the Simplified Practice Recommendations.

Competition has led many manufacturers to seek relief through "individualism". As a result, complicated practices have followed. This signifies that many manufacturers have not yet learned that cooperation can exist in the presence of competition.

It is acknowledged that difficulties confront the manufacturers of novelty or luxury goods, in so far as simplification is concerned. Despite this, many New England manufacturers of these types of products have made considerable progress in simplified practice. As an example, two manufacturers of silver-ware wrote that they have simplified their lines appreciably.

Although New England concerns are fairly well versed
in the need of simplification in industry, the adoption of simplified practices have not been entirely successful. The percentage of manufacturers adopting simplified practice is much lower than it should be. Unquestionably, simplification can never be expected to reach the one hundred per cent mark, but in many industries throughout the United States, better than eighty per cent conformation to the Department of Commerce Recommendations has been reached. The Recommendations, to be sure, cover but a very limited number of products -- little more than one hundred -- but the manufacturers who agreed in the past to accept the Recommendations have not carried out the simplified practices to a satisfactory degree. This is augmented by the fact that the percentage of non-acceptors who have adopted simplification very nearly equals the percentage of acceptors in the same class, and yet only one-third of the non-acceptors have had contact with the United States Department of Commerce Simplified Practice Division.
SUMMARY

THE BENEFITS OF SIMPLIFICATION

Manufacturers, accepting the Division of Simplified Practice Recommendations and adopting simplification, have realized many benefits from the practice. The amount of savings accruing from particular benefit varies with each individual company. Also, with very few exceptions, no one company has realized all the benefits which may be attributed to simplified practice.

The benefit, resulting from simplification which has been received by the greatest number of acceptors has been that of decreased tied-up capital. This has been particularly true of lessened capital expenditure in raw materials, semi-finished stock, finished stock, and storage floor space. To a lesser degree, considerable savings have been effected in reducing capital tied up in jigs, dies, templates, special machinery and repair parts.

More economical manufacture has resulted particularly from the larger units of production, longer runs, and more effective stock control which have been brought about by simplified practice. Higher rates of individual production, cheaper handling of stock, elimination of waste
in design, and standardized material inventories, resulting from simplification, have also contributed to a more economical production of acceptors' products.

Simplified practice has proven beneficial to many firms in increasing the efficiency of labor by increasing individual production, simplifying training, and by the increased skill due to repetitive processes. A few companies, due to their simplification, have also been able to increase the contentedness of the workmen, to reduce idle labor from preventable causes, and to make employment more permanent. Analysis of the questionnaires reveals the fact that the number of acceptors benefiting through more efficient labor is considerably less than the number who have benefited from less tied up capital and more economical manufacture.

A considerable portion of the acceptors have, through simplification, hastened deliveries, reduced obsolete material, and decreased the quantity of required packing. A few concerns have been able to improve the quality of their products. These accomplishment have produced a better service to the trade.
The efficiency of the sales force has been improved through increased turnover rates, intensified sales momentum, easier financing, fewer factory shutdowns, and a decreased number of productive processes. The percent of manufacturers who have benefited through these practices is small in comparison with those benefited by some of the other results of simplification.

Non-acceptors have received practically the same benefits as those received by accepting concerns, and to practically the same degree. This is particularly true of those benefits which are gained by the larger number of acceptors.

Fifty percent or more of the concerns who have adopted simplified practices (both acceptors and non-acceptors) have realized the following benefits through simplification: decreased capital tied-up in finished stock; more economical manufacture through more effective stock control; and, better service to the trade and more prompt delivery. The following benefits are common to a large number of acceptors and non-acceptors alike: less capital tied up in raw materials, semi-finished stock, and storage floor space; more economical manufacture through
larger units of production, longer runs, higher rates of individual production, and cheaper handling of stock; and, more efficient labor due to increased individual production.
CONCLUSIONS
CONCLUSIONS

INCIDENCE OF SIMPLIFICATION

From the facts presented in this report, we conclude:

1. That the majority of New England manufacturers recognize the advantages which may be derived through simplification.

2. That many of the New England manufacturers have not yet taken organized steps to realize these advantages.

3. That the simplification movement is slowly progressing throughout New England.

4. That the present economic conditions have led to a suspension of simplified practices by many concerns.

5. That the incidence of simplification in New England industries is shared to nearly an equal degree by both non-acceptors and acceptors of the United States Department of Commerce Simplified Practice Recommendations.
6. That the belief that all industries producing style and luxury goods are not adapted to simplification is in error.

7. That lack of cooperation is not a serious obstacle to simplified practice measures among New England manufacturers.
CONCLUSIONS

BENEFITS OF SIMPLIFICATION

From the facts presented in this report, we also conclude:

1. That the benefits received by New England manufacturers, through the adoption of simplified practice, have been many.

2. That the same benefits received by acceptors of the United States Department of Commerce Simplified Practice Recommendations are shared by non-acceptors to almost an equal degree.

3. That the most common benefits, resulting from simplified practice, are to be found in decreased capital tied-up in raw materials, semi-finished stock, finished stock, and storage floor space, in more economical manufacture through effective stock control, larger units of production, longer runs, and higher rates of individual production, and cheaper handling of stock,
and in more efficient labor due to increased individual production.
ANALYSIS OF QUESTIONNAIRES
ANALYSIS OF QUESTIONNAIRES

ACCEPTORS

The results of the analysis of the replies to the questionnaires submitted to those manufacturers who, in the past, had agreed to accept the Simplified Practice Recommendations of the United States Department of Commerce, were unexpected. Only thirty-three percent are carrying out the recommendations in full. Twenty-nine percent are carrying out the recommendations in part, and twenty-five percent are using no simplified practices. Answers from the remaining thirteen percent were valueless.

ADHERENCE IN FULL

Of these manufacturers adopting the recommendations in full, several are turning out products which are affected by the recommendations to but a slight degree, whereas, the entire output of a few companies in this class come directly under the Simplified Practice Recommendations. For this reason, equal weight cannot be attached to the degree to which the acceptors are carrying out the recommendations. As an example, an ice manufacturer, accepting the recommendations in
reference to ice cake sizes is required to make little effort in carrying out the simplified practice, whereas, a large manufacturer of grinding wheels must carefully weigh the advantages and disadvantages connected with decreasing or changing his products to conform with the recommendations. In this respect, replies to the questionnaires show, in general, that those manufacturers making products which are highly affected by the recommendations, and who are carrying out the practices in full, are among the leaders in their particular industry. Companies of this type include the Norton Company, Plymouth Cordage, Remington Arms, Winchester Repeating Arms, and the Simonds Saw and Steel Company. It must not be inferred from the preceding statements, however, that all leading concerns have adopted the recommendations.

ADHERENCE IN PART

Twenty-nine percent of the concerns filling out the questionnaires are adopting the recommendations in part only. However, twenty-four percent of these companies have also adopted simplified practices other than those proposed by the Department of Commerce. Such practices include, particularly, trade practices
and methods adopted by the different companies to cover those products which have not, as yet, received the attention of the Bureau of Simplified Practice. Simplified Practice measures have been adopted by such associations as the National Trade Paper Associations and the National Machine Tool Builders' Association. There are many others. It appears that members of these associations are more ready to accept the recommendations of their organization than the recommendations of the United States Department of Commerce. This is especially true where any overlapping or conflict of the recommendations occur.

Such procedure is to be expected, since the member concerns feel a closer alliance with the trade organization than they do with the governmental body.

Several concerns have adopted simplified practices of their own which cover the lines not yet taken up by the Bureau of Simplified Practice. Where these lines interlock and conflict with the Department of Commerce Recommendations, the companies in question have discarded the Government proposals. This has been accounted for by the fulfillment in part of only a number of accepting companies.
Another prevalent reason for not adopting the recommendations in full is that of customer demand. Manufacturing jobbers who produce to order and not to stock must conform with the desire of the purchaser. The "red tape" of specification-writers is a difficult barrier for simplified practice to hurdle. In practically all cases where the manufacturers are producing to order, and have adopted the recommendations in part, they replied that they make every effort to sell the customer goods which conform with the Simplified Practice Recommendations. If they fail in this attempt, they must, because of their type of business, meet the demands of their customers.

NON-ADHERENCE

Twenty-five percent of those manufacturers who have accepted the Bureau of Simplified Practice Recommendations, and answered the questionnaires have not adopted the recommendations. Their reason for this lack of cooperation are varied. It is interesting to note that only one manufacturer definitely stated that his reason for not adopting simplified practices was lack of cooperation throughout the industry. One other manufacturer who has adopted the
recommendations in full, stated that he felt simplified practice would have to be abandoned by his company if more cooperation was not shown by other manufacturers in his industry.

The most common reason for not adopting simplified practice was that of lack of adaptability. Concerns which manufacture to order and specification find considerable difficulty in maintaining simplified practice. This is particularly true of concerns which form one of the links of an integrative industry. Two of the largest manufacturers, in this country, of automobile brake lining replied that simplified practice would be of unquestioned benefit to them but that the automotive companies are very reluctant to standardize on brake lining or clutch facings sizes. In this case, the brake lining manufacturers must follow the specifications of the automotive companies and manufacture all types, widths, and thicknesses specified. It may be reasoned that this is a case of lack of cooperation by brake lining manufacturers in not simplifying their products and adhering to the recommendations. However, the output of these companies
is so closely controlled by the automotive companies and the individual sales are so large, that there would be little trouble experienced by the automobile manufacturers in finding some other companies -- possibly newly formed -- who would be only too willing to meet the requirements specified. There are other similar cases.

Several Companies, feeling the stress of present business conditions, declared that it was of more advantage to them to keep their mills going on any kind of work, rather than have idle machines and labor on their hands. One manufacturer wrote that he would prefer to make any shape or size of product, then to take the risk of losing an order by requesting his prospective customer to comply with some standard.

Other manufacturers, in the throes of severe competition, believe that it is necessary to meet the customers every whim in order to get the business. As a result, there has been a decided tendency, with some toward increasing the number of grades, sizes, weights, etc. In these cases, complicated practice instead of simplified practice, has been the rule. However,
these cases are exceptional rather than general.

A few companies wrote that they had changed over to specialty products since the time that they had accepted the Bureau of Simplified Practice Recommendations. These companies maintain that their type of business requires a continual changing and adding to of products, and, as a result, simplified practice is beyond their control. This question is discussed at greater length in another section of this thesis.
ANALYSIS OF QUESTIONNAIRES

NON-ACCEPTORS

Two hundred and thirty questionnaires were submitted to New England manufacturers who were not listed as acceptors of the Simplified Practice Recommendations of the United States Department of Commerce. One hundred and twenty-seven replies were received, of which number, sixteen were valueless. Fifty-two percent of the number of manufacturers replying have adopted some form of simplified practice. Of this group, forty-four percent have had contact with the Simplified Practice Recommendations of the Department of Commerce. Fifty-six percent have not. In every case where simplified practices were adopted, and the company in question had contact with the Simplified Practice Recommendations, the recommendations were carried out, either in full or in part. As may be expected from the analysis of acceptors' replies, the recommendations have supplemented, in many cases, by other simplified practices.

ADOPTERS

That group of manufacturers who have adopted simplified practice measures and have had no contact with the recommendations, have followed practices originat-
ing either within their own organization, or trade associations of which they are members. In a few cases, simplified practice has consisted merely of following the standards set by some organization such as the A.S.T.M. A large box manufacturer stated that simplified practices within his company followed the regulations of the Uniform Freight Classification Rules. It may be readily realized that such procedure might bring about a high degree of simplification to a company of this type. Many manufacturers wrote that their simplification practices had been in effect for a number of years, others indicated that those measures had but recently occupied their attention.

**NON-ADOPTERS**

Forty-five percent of the non-accepting companies replying to the submitted questionnaires stated that they had adopted no simplification measures. It is interesting to note that only sixteen percent of this group have had contact with the Bureau of Simplification. The majority of the remaining eighty-four percent wrote that they were not acquainted with the Department of Commerce Recommendations. However, in no case was this
fact given as a reason for not adopting simplified practices. Eighty-four percent of these companies replied that their industry was not adapted to simplification.

It might be well to deviate at this point and consider the question of those manufacturers who wrote that their type of industry was not conducive to simplification. Two prominent shoe manufacturing concerns replied that their product was a "style goods" and that, for this reason, simplification could not be adopted. These same manufacturers maintain that in order to provide sales appeal and meet the problem of competition, their products must be diversified which necessitates complicated practice. Consider the case of the Regal Shoe Company. This company formerly manufactured three different grades, and twenty-five hundred different styles. They now make one grade and one hundred styles. This company has had a retail inventory decrease of twenty-six percent since 1921, and yet sales have had a remarkable increase. There has been a retail price reduction of thirty-five percent, but the ratio of current assets to current liabilities has increased from 1.79 to more than five to one. The Regal Shoe Company considers
that no one other factor has contributed to these results more than simplification measures adopted by this company. This is an outstanding example of what has been accomplished by a company operating in an industry "not adapted to simplification." It is highly improbably that there are not others.

Only seven per cent of the companies adopting no simplification practices stated that lack of cooperation throughout the industry prevented the adoption. This low figure corresponds with the results obtained from the analysis of the acceptors replies.

Other manufacturers gave competition as a reason for not applying simplification measures. As in the case of the similar group among the acceptors, these manufacturers believe that the buyer is king, and that it is necessary to manufacture any shape or size of product rather than risk losing an order by requesting the prospective customer to comply with some standard, or by elevating the prices on the slow-moving goods. There is little doubt that present economic conditions strengthen these beliefs.
COMPARISON

The percentage of manufacturers adopting simplification measures is slightly higher in the case of those who are listed as acceptors of the Simplified Practice Recommendations than in the case of those who are not. It follows that the percentage of acceptors not adopting simplified practices is less than the corresponding group of non-acceptors. However, the difference, -- a matter of 10%, -- is much smaller than was expected between the two classes of manufacturers investigated. Also, fifty-five percent of the non-acceptors replied to the questionnaires, whereas, the acceptors gave only a forty-eight percent return. It was expected by the authors that the acceptors would give the largest return of the questionnaires, due to the fact that this group had previously expressed interest in the matter of an organized plan of simplification. It is realized, of course, that little stress can be placed on the importance of such minor deviations in a set of questionnaires so limited in number and scope as were those submitted.
BENEFITS OF SIMPLIFICATION

ACCEP'TORS*

The usual benefits received by adopters of simplified practice are divided into five general divisions, namely, less tie-up in capital, more economical manufacture, more efficient labor, better service to the trade and a more efficient sales force. The degree of benefit received varies in each division, and also with each company. Replies to the questionnaires were analyzed to determine if certain benefits are predominant.

LESS CAPITAL TIED UP

The analysis of the questionnaires sent to the acceptors of the Division of Simplified Practice Recommendations showed that the largest number of manufacturers believed that their benefits were received through a smaller tie-up of capital. Sixty percent of those adopting simplification measures stated that they had received savings through less capital tied up in finished stock. The same number have also profited through less capital tied up in storage floor space. Fifty percent felt that the reduction of tied-up cap-

*See Appendix C
ital in semi-finished stock had been of aid to them. An almost equal number (forty-seven percent) expressed themselves as having benefited from less capital tied up in raw materials. Approximately one-third of these manufacturers wrote that they have gained by reducing the capital expended in jigs, dies, templates, and special machinery. Capital in repair parts has been reduced by twenty-seven percent of the acceptors who have adopted simplification. In no other way have the accepting manufacturers benefited to the degree that they have through reduction of tied-up capital.

**ECONOMICAL MANUFACTURE**

Simplification has proven beneficial to many concerns in the matter of economical manufacture. This has been accomplished in one or more of a variety of ways. Approximately one-half of the acceptors, who have adopted simplified practices, stated that they had benefited by the larger units of production, longer runs, and more effective stock control, resulting from simplification. Simplified practice has resulted in higher rates of individual production and cheaper handling of stock, for almost forty percent of the acceptor concerns adopting simplification. Nearly one-third of these
concerns have also been able to make a more accurate and proper estimate of production, to reduce their clerical overhead, and to eliminate waste in design. A lesser number (twenty-three percent) stated that simplification has lessened their idle equipment, made their costs system more accurate, has standardized the material inventories, and has reduced the amount of equipment. Seventeen percent of the acceptor manufacturers adopting simplification wrote that simplified practice has resulted in better inspection and greater ease in securing raw materials. From accompanying letters to the questionnaires, the most important savings were made in the economical manufacture through larger runs, higher rates of individual production, greater ease in securing raw materials, and standardized material inventories.

EFFICIENT LABOR

More efficient labor has resulted from simplification for many companies. However, the number benefiting through this source has not been as large as the number who have benefited from less tied-up capital and more economical manufacture. The highest percentage of those concerns which have profited through
more efficient labor have found that this saving has been incurred in increased individual production. Forty percent of those adopting simplified practice have benefited in this way. Simplification has produced more efficient labor through simplified training of employees for twenty-seven percent of the acceptors who have adopted simplification. A like percentage have been aided in a similar manner through the increased skill of employees brought about by repetitive processes. A much lesser number have improved their labor by simplified practice through the media of more contented workmen, less idle labor from preventable causes, more permanent employment, and through less difficulty in getting help. Apparently the benefits of simplification through more efficient labor has not proven particularly effective for the majority of acceptors who have adopted simplified practice measures.

**BETTER TRADE SERVICE**

Better service to the trade has been brought about by simplification. This has occurred in a number of ways, particularly through more prompt delivery, less obsolete material, less errors in shipment, etc. Fifty-seven per-
cent of the manufacturers adopting simplified practice have benefited by less obsolete material, fifty-three percent by more prompt deliveries, and thirty-three percent by less errors in shipment. A lesser number have been able to decrease the quantity of packing required per shipment and by improving the quality of their products. It may be readily noted that simplification has been of particular aid in bettering trade service.

**EFFICIENT SALES FORCE**

The efficiency of the sales force has been improved by many manufacturers through the adopting of simplified practices. Increased rate of turnover, intensified sales momentum, and easier financing -- resulting from simplification -- has been the means of increasing the sales force efficiency. However, the number of concerns profiting by these means are considerably less than the number who have profited through most of the divisions previously discussed. The analysis of the questionnaires show that twenty-seven percent of the simplifying manufacturers benefited by an increased rate of turnover, thirteen percent by intensified sales momentum, and by easier financing, ten percent by earlier plans and schedules, and seven percent by fewer factory shutdowns.
MOST COMMON BENEFITS

Those benefits which were shared by the majority of simplifying concerns, include: less capital tied-up in storage floor space, finished stock, semi-finished stock, and raw materials; more economical manufacture through effective stock control, and longer runs; and by better trade service resulting from lessened obsolete material, and by more prompt delivery.
BENEFITS OF SIMPLIFICATION

NON-ACCEPTORS*

LESS CAPITAL TIED UP

As in the case of the acceptors, more non-acceptor manufacturers adopting simplification received benefit through lessened capital tie-up, than by any other means. Fifty-five percent of these concerns reduced the capital expenditure in finished stock. Nearly as many (fifty-three percent) reduced their raw materials. Semi-finished stock was diminished by thirty-nine percent of the non-acceptor concerns adopting simplified practices. Thirty-nine percent of the manufacturers have been able to lessen their tied-up capital by a reduction of storage floor space. The number of repair parts and jigs, dies, templates, and special machinery has been materially cut down by a number of concerns. It is the belief of several companies that the most important savings in reduced capital investment are due to diminished raw materials, semi-finished stock, and finished stock.

ECONOMICAL MANUFACTURE

More effective stock control has produced a more economical manufacture of products for fifty-eight percent of the simplifying concerns. Simplification has resulted

*See Appendix D
in cheaper handling of stock for fifty-five percent of
the non-acceptors replying to the questionnaire. Ap-
proximately forty percent stated that they had been ab-
le, through simplification, to make longer runs, to el-
iminate waste in design, and to standardize material in-
ventories. Simplified practice has produced more ac-
curate and proper estimating of production, better and
more simplified inspection, reduced clerical overhead,
and more accurate costs systems, for nearly thirty-five
percent of the non-acceptor concerns. In addition, very
close to thirty-one percent of these companies have ben-
efted through more economical manufacture resulting from
higher rates of individual production, and from greater
ease in securing raw materials. Equipment has been re-
duced, and idle equipment has been lessened by approx-
imately one-quarter of the manufacturers who have not ac-
cepted the United States Department of Commerce Simplified
Practice Recommendations. Other given reasons for more
economical manufacture because of simplification, are
more favorable piece prices and reduction in non-produc-
tive labor. A few companies mentioned the fact that
their greatest benefits were a result of longer runs, high-
rates of individual production, elimination of waste in
design and standardized material inventories.

EFFICIENT LABOR

Increased individual production and increased skill due to repetitive processes have followed simplified practice for thirty-five percent of the non-acceptor concerns adopting simplification measures. Nearly as many concerns have benefited by less idle labor from preventable causes, and more simplified training of employees. Twenty-seven percent of the concerns making use of simplified practices have increased the contentedness of their employees. A smaller number of concerns have increased the efficiency of the working force by more permanent employment, as contrasted with seasonable employment, and by reducing the difficulty in securing help. These factors have been attributable to the simplification which these concerns have effected. More efficient labor has also been realized through less errors in work, and through loss by damage while in process by several companies. One manufacturer replied that his most important savings in increased efficiency of labor has been due to the skill increased by repetitive processes. Another stated that particular benefit has resulted from the increased individual production incurred through simplification.
BETTER TRADE SERVICE

Similar to acceptors of the Division of Simplified Practice Recommendations, considerable benefit has been received by the non-acceptor concerns through the means of better service to the trade. More than sixty percent of the non-acceptors have been able to provide more prompt delivery to their customers due to simplifying their products. Close to, or better than thirty percent have improved the quality of the products, decreased errors in shipment, and decreased the quantity of required packing. A number of manufacturers have also been able to reduce the number of packages broken in transit. One manufacture wrote that competition has been reduced to the comparative merits of service factors rather than the relative merits of competing designs. Unquestionably, the greatest betterment in trade service, due to simplification by non-acceptors, has resulted from promptness of delivery.

EFFICIENT SALES FORCE

Simplified practice has increased the efficiency of the sales forces of a number of non-acceptor firms. Turnover has been increased, sales momentum intensified, financing made easier, production processes decreased, factory
shutdowns decreased, and earlier plans and schedules effected. The number of manufacturers who have realized these benefits is not as large as the number benefitting by simplification through some of the other means previously considered. However, thirty-five percent of the non-acceptors, simplifying their products, have raised the efficiency of their sales force by increasing the rate of turnover. Twenty-six percent have found that their sales momentum has been intensified. Close to twenty percent have had fewer factory shutdowns, easier financing, and earlier plans and schedules, as a result of simplification. Other manufacturers have discovered that simplified practice has led to a decrease of considerable sales resistance, that less undesirable merchandise has been withdrawn from sales at the end of the season, and that consumer acceptance of the product has been assured.

**MOST COMMON BENEFIT**

More than half of those concerns who have not subscribed to the Simplified Practice Recommendations, but who have adopted simplification measures, benefited by reducing their tied-up capital in raw materials and finished stock, by manufacturing more economically because of a more effective stock control, and by improving their service to the trade in giving a more prompt delivery
service. An almost equal number have been able to reduce their semi-finished stock, to make larger units of production and longer runs, to handle their stock more cheaply, to standardize their material inventories, and to reduce their obsolete material. These benefits have been accrued as a direct result of simplification.
COMPARISON*

The analysis of the benefits received by the acceptors and non-acceptors shows no great degree of coincidence as to the percent of simplified practice adopters receiving any particular benefit. This fact is to be expected where the number of concerns replying to the questionnaire are so limited. However, it is noted that those benefits shared by the greater number of acceptors are, in nearly all cases, predominant with the non-acceptors.

Savings in lessened tied-up capital, due to simplification, are effected by fifty percent or more of the acceptors through a reduction of semi-finished stock, finished stock, and storage floor space. The same benefits with the exception of reduced floor space, to an approximately equal degree, were received by the non-acceptors. Only thirty-nine percent of the non-acceptors replied that they had benefited by a reduction in storage floor space. Relatively few acceptors signified that they are able to reduce their capital expenditures in jigs, dies, templates, special machinery, and repair parts. This is equally true of non-acceptors.

*See Appendix E
The percentage of acceptors and non-acceptors sharing like benefits affecting more economical manufacture are more divergent than in the case of lessened tied-up capital. The factors influencing more economical manufacture and which are shared by the largest number of acceptors and non-acceptors alike, are larger units of production, longer runs, and more effective stock control. A high percentage of acceptors replied that they had benefited by higher rates of individual production, whereas the number of non-acceptors profiting by this means was considerably lower. Simplification resulted in economical manufacture for a large number of non-acceptors through cheaper handling of stock, elimination of waste in design, and standardized material inventories. No particularly great number of acceptors benefitted by these same factors, although other benefits leading to a more economical manufacture were not enjoyed by any outstanding percentage of either acceptors or non-acceptors, these percentages varied considerably.

Simplified practice has proven beneficial, to an approximately equal percentage of acceptors and non-acceptors, in increasing the efficiency of labor through
more simplified training, increased individual production, and increased skill due to repetitive processes. However, more than twenty percent of the non-acceptors have benefited by an increased contentedness of employees, less idle labor from preventable causes, more permanent employment, and less difficulty in getting help. Ten percent or less of the acceptors of the Simplified Practice Recommendations received material benefit through these factors.

Practically equal percentages of acceptors and non-acceptors have been able to better their trade service by more prompt delivery, decreased quantity of packing, less errors in shipment, and less obsolete material. More acceptors and non-acceptors have improved the service to trade through prompt delivery than by any other means. A higher percent of non-accepting firms have benefited as a result of simplification through a higher quality of product and through fewer packages broken in transit, than have acceptors.

The efficiency of the sales force has been improved through an increased rate of turnover, and a decreased number of production processes for an approximately equal percent of acceptors and non-acceptors. However, the
percent of non-acceptors who have been benefited by intensified sales momentum, easier financing, fewer factory shutdowns, and earlier plans and schedules, is nearly twice the percent of acceptors benefited by the same items.

The benefits of simplification which are received by the greatest number of acceptors are almost exactly the same as those received by the greatest number of non-acceptors. These benefits include less capital tied up in raw materials, semi-finished stock, finished stock, and storage floor space; more economical manufacture through larger units of production, longer runs, and effective stock control; and better service to the trade in less obsolete material and more prompt material.
APPENDICES
APPENDIX A

Questionnaires Submitted to Acceptors
1) As an acceptor of the United States Department of Simplified Practice Recommendations we are carrying out the recommendations in full
in part
not at all
(If recommendations have not been carried out at all, you will only be interested in answering question #5, following sheet.)

2) The following are commonly listed as benefits of simplification. Has your company experienced any of these benefits since your adoption of simplified practice? If so, please check the specific benefits experienced:

LESS CAPITAL TIED UP IN

Raw Materials
Semi-finished Stock
Jigs, dies, templates and special machinery
Storage Floor space
Repair parts

MORE ECONOMICAL MANUFACTURE THROUGH

Larger units of production
Longer runs
Higher rates of individual production
Accurate and proper estimating production
More effective stock control
Better and more simplified inspection
Less idle equipment
Reduced amount of equipment
Greater ease in securing raw materials
Cheaper handling of stock
Reduced clerical overhead
More accurate costing system
Elimination of waste in design
Standardized material inventories

MORE EFFICIENT LABOR DUE TO

Making training of employees more simple
Increased individual production
Happier and more contented workmen
Skill increased by repetitive process
Less idle labor from preventable causes
More permanent employment as contrasted to seasonable employment
Less difficulty in getting help

BETTER SERVICE TO THE TRADE IN
Better quality of product
More prompt delivery
Decreased quantity of packing required
Fewer packages broken in transit
Less chance of errors in shipment
Less obsolete material

MORE EFFICIENT SALES FORCE
Increased rate of turnover
Intensified sales momentum
Easier Financing
Fewer Factory Shutdowns
Earlier plans and schedules
Decreased in number of production processes

ANY OTHER BENEFITS
Kindly explain ____________________________

3) We have simplified our products ____% or from ____ articles to ____ Articles ____.

4) We have adopted simplification practices other than those proposed by the United States Department of Commerce. Yes No

4) We have not accepted the Simplified Practice Recommendations because:
Lack of cooperation throughout the industry
Other reasons (Explain) ____________________________
APPENDIX B

Questionnaires Submitted to Non-Acceptors
NON-ACCEPTOR

1) Have you adopted any simplification measures?  Yes___  No___

2) Have you had contact with the Simplified Practice Recommendations of the U.S. Dept. of Commerce? Yes___  No___

3) We have simplified our products ___ % or from ___ articles to ___ articles.

(If simplification practice has not been adopted kindly check question #6 on following sheet)

4) We have adopted simplification measures for the following reasons:
   
   **LESS CAPITAL TIED UP IN**
   ___ Raw Materials
   ___ Semi-finished Stock
   ___ Finished Stock
   ___ Jigs, dies, templates and special machinery
   ___ Storage floor space
   ___ Repair parts

   **MORE ECONOMICAL MANUFACTURE THROUGH**
   ___ Larger units of production
   ___ Longer runs
   ___ Higher rates of individual production
   ___ More effective stock control
   ___ Better and more simplified inspection
   ___ Less idle equipment
   ___ Reduced amount of equipment
   ___ Greater ease in securing raw materials
   ___ Cheaper handling of stock
   ___ Reduced clerical overhead
   ___ More accurate costing system
   ___ Elimination of waste in design
   ___ Standardized material inventories

   **MORE EFFICIENT LABOR DUE TO**
   ___ Making training of employees more simple
   ___ Increased individual production
Happier and more contented workmen
Skill increased by repetitive process
Less idle labor from preventable causes
More permanent employment as contrasted to seasonal employment
Less difficulty in getting help

BETTER SERVICE TO THE TRADE IN
Better quality of product
More prompt delivery
Decreased quantity of packing required
Fewer packages broken in transit
Less chance of errors in shipment
Less obsolete material

MORE EFFICIENT SALES FORCE
Increased rate of turnover
Intensified sales momentum
Easier financing
Fewer factory shutdowns
Earlier plans and schedules
Decreased in number of production processes

ANY OTHER BENEFITS
Kindly explain

5) We have adopted simplification practices other than those proposed by the United States Department of Commerce. No____ Yes____

(If yes, kindly explain)

6) We have not adopted any simplification measures because of the following reasons:
Industry not adapted to simplification
Lack of cooperation throughout the Industry
Other reasons. (Explain)
APPENDIX C

Statistics of Acceptors Replies
STATISTICS OF ACCEPTORS

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>% of Replies</th>
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<tr>
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<td></td>
</tr>
<tr>
<td>In full</td>
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<td>33</td>
</tr>
<tr>
<td>In part</td>
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<tr>
<td>Not at all</td>
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<td>25</td>
</tr>
<tr>
<td>Benefits received by those accepting in full or part:</td>
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<td></td>
</tr>
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<td>A. Less Capital Tied Up In:</td>
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</tr>
<tr>
<td>a. Raw Materials</td>
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<tr>
<td>b. Semi-finished stock</td>
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<td>c. Finished Stock</td>
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<tr>
<td>d. Jigs, dies, templates and special machinery</td>
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<td>30</td>
</tr>
<tr>
<td>e. Storage floor space</td>
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<tr>
<td>f. Repair parts</td>
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<td>27</td>
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<td>B. More Economical Manufacture Through:</td>
<td></td>
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<tr>
<td>a. Larger units of production</td>
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<td>b. Longer runs</td>
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<td>50</td>
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<tr>
<td>c. Higher rates of individual production</td>
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<td>43</td>
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<tr>
<td>d. Accurate and proper estimating production</td>
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<td>30</td>
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<tr>
<td>e. More effective stock control</td>
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<tr>
<td>f. Better and more simplified inspection</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>g. Less idle equipment</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>h. Greater ease in securing raw materials</td>
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<td>17</td>
</tr>
<tr>
<td>i. Cheaper handling of stock</td>
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<td>37</td>
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<td>j. Reduced clerical overhead</td>
<td>8</td>
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<tr>
<td>k. More accurate costs system</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>No.</td>
<td>% of Adopters</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>l.</td>
<td>8</td>
<td>27</td>
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</tbody>
</table>

l. Elimination of waste in design

m. Standardized material inventories

n. Reduced amount of equipment

C. More Efficient Labor Due To:
   a. Making training of employees more simple
   b. Increased individual production
   c. Happier and more contented workmen
   d. Skill increased by repetitive process
   e. Less idle labor from preventable causes
   f. More permanent employment contrasted with seasonal employment
   g. Less difficulty in getting help

D. Better Service to Trade In:
   a. Better quality of product
   b. More prompt delivery
   c. Decreased quantity of packing required
   d. Fewer packages broken in transit
   e. Less chance of errors in shipment
   f. Less obsolete material

E. More Efficient Sales Force Through:
   a. Increased rate of turnover
   b. Intensified sales momentum
   c. Easier financing
   d. Fewer factory shutdowns
   e. Earlier plans and schedules
   f. Decreased number of production processes
| Number adopting simplification practices other than those proposed by the U.S. Dept. of Commerce | 9 | 30 |
| Number not adopting simplification practices other than those proposed by the U.S. Dept. of Commerce | 9 | 30 |

**Reasons for Not Adopting Simplified Practice Recommendations:**

| Lack of cooperation throughout the industry | 1 | 8 |
| Other Reasons | 9 | 75 |

| Number of questionnaires submitted | 100 | 100 |
| Number of replies | 48 | 48 |
APPENDIX D

Statistics of Non-Acceptors Replies
### Statistics of Non-Acceptors

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<tr>
<th>Description</th>
<th>No.</th>
<th>% of Replies</th>
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<td>Number not adopting simplification practices</td>
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<td>Number having contact with U.S. Dept. of Commerce Recommendations</td>
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<tr>
<td>Number not having contact with Recommendations</td>
<td>74</td>
<td>67</td>
</tr>
</tbody>
</table>

**Benefits received by those adopting simplified practices**

#### A. Less Capital Tied Up In:

- a. Raw Materials                                                          | 35  | 53           |
- b. Semi-finished stock                                                     | 31  | 47           |
- c. Finished Stock                                                         | 36  | 55           |
- d. Jigs, dies, templates and special machinery                            | 18  | 27           |
- e. Storage floor space                                                     | 26  | 39           |
- f. Repair parts                                                           | 14  | 21           |

#### B. More Economical Manufacture Through:

- a. Larger units of production                                             | 29  | 44           |
- b. Longer runs                                                            | 23  | 42           |
- c. Higher rates of individual production                                  | 20  | 30           |
- d. Accurate and proper estimating production                              | 22  | 33           |
<table>
<thead>
<tr>
<th>No.</th>
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<td>More effective stock control... 38</td>
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<td>f.</td>
<td>Better and more simplified inspection................... 23</td>
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<td>g.</td>
<td>Less idle equipment.................. 17</td>
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<tr>
<td>h.</td>
<td>Reduced amount of equipment....... 16</td>
</tr>
<tr>
<td>i.</td>
<td>Greater ease in securing raw material.......................... 20</td>
</tr>
<tr>
<td>j.</td>
<td>Cheaper handling of stock............ 30</td>
</tr>
<tr>
<td>k.</td>
<td>Reduced clerical overhead......... 23</td>
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<tr>
<td>l.</td>
<td>More accurate cost system........ 22</td>
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<td>m.</td>
<td>Elimination of waste in design... 25</td>
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<tr>
<td>n.</td>
<td>Standardized material inventories....................... 28</td>
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</table>

**C. More Efficient Labor Due To:**

| a.  | Making training of employees more simple.................... 20 | 30 |
| b.  | Increased individual production.......................... 23 | 35 |
| c.  | Happier and more contented workmen......................... 18 | 27 |
| d.  | Skill increased by repetitive processes.............................. 23 | 35 |
| e.  | Less idle labor from preventable causes.................... 21 | 32 |
| f.  | More permanent employment contrasted with seasonable employment.............. 14 | 21 |
| g.  | Less difficulty in getting help.. 13 | 20 |

**D. Better Service to the Trade In:**

| a.  | Better quality of Product............ 22 | 33 |
| b.  | More prompt delivery.......................... 41 | 62 |
| c.  | Decreased quantity of packing required........................... 19 | 28 |
| d.  | Fewer packages broken in transit.. 10 | 15 |
| e.  | Less chance of errors in shipment.......................... 22 | 33 |
| f.  | Less obsolete material................ 23 | 42 |
|Reasons For Not Adopting Any Simplification Measures: | No. | % of Repli
<table>
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<td>Lack of cooperation throughout the industry...........</td>
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<td>Other reasons...........................................</td>
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</table>

|Number adopting simplified practice - contact with Recommendations........ | 29  | 27      |
|Number adopting simplified practice - no contact with Recommendations.... | 37  | 33      |
|Number not adopting simplified practice contact with Recommendations..... | 8   | 7       |
|Number not adopting simplified practice - no contact with Recommendations | 37  | 33      |

|Number of questionnaires submitted | 230 | 100      |
|Number of replies                  | 127 | 55       |
APPENDIX E

Comparison of Benefits
## COMPARISON OF BENEFITS RECEIVED BY ACCEPTORS AND NON-ACCEPTORS

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Acceptors</th>
<th>Non-Acceptors</th>
<th>Variation in % Based on Acceptors</th>
<th>% Variation Based On Acceptors</th>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
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<td>53</td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
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<tr>
<td>c.</td>
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<tr>
<td>d.</td>
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<tr>
<td>e.</td>
<td>60</td>
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<tr>
<td>f.</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>a.</td>
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<td>d.</td>
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<td>g.</td>
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<tr>
<td>k.</td>
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<td>Benefit Acceptors</td>
<td>Non-Variation Acceptors Based on Acceptors</td>
<td>Variation in % Based On Acceptors</td>
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<td>m.</td>
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### COMPARISON OF BENEFITS RECEIVED BY ACCEPTORS AND NON-ACCEPTORS

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APPENDIX F

Graphs
Adopting Simplified Practices of Dept. of Commerce (In Full or in Part)

- Adapting No. Simplification
  - Adapting Other Practices

- Adapting Simplified Practices
  - Adapting No. Simplification
  - Adapting Other Practices

Acceptors

Non-Acceptors
APPENDIX G

Acceptors Replying to Questionnaires
ACCEP TO RS REPLYING TO QUESTIONNAIRES

American Wheel Works  
Providence, R.I.

Ames Shovel & Tool Company  
Boston, Mass.

Bay Company  
Bridgeport, Conn.

Bigelow & Dowse Company  
Boston, Mass.

Bridgeport Brass Company  
Bridgeport, Conn.

Brown & Sharp Mfg. Company  
Providence, R.I.

Chandler & Farquhar, Inc.  
Boston, Mass.

Clark-Flanagan, Inc.  
Fair Haven, Vt.

Coburn Trolley Track Mfg. Company  
Holyoke, Mass.

Eastern Malleable Iron Company  
New Britain, Conn.

Fair Haven Marble & Marbleized Slate  
Fair Haven, Vt.

Forbes Lithograph Mfg. Company  
Boston, Mass.

The Artford Faience Company  
Hartford, Conn.

Heywood-Wakefield Company  
Boston, Mass.

Hope Webbing Company  
Pawtucket, R.I.
Howland Bag & Paper Company
Boston, Mass.

International Silver Company
Meriden, Conn.

Jones & Lamson Machine Company
Springfield, Vt.

Lawrence Duck Company
Boston, Mass.

Malleable Iron Fittings Company
Branford, Conn.

Metal Clad Doors
Cambridge, Mass.

Morse Twist Drill & Machine Company
New Bedford, Mass.

Mossburg Pressed Steel Corporation
Attleboro, Mass.

Multibestos Company
Walpole, Mass.

Nicholson File Company
Providence, R.I.

Norton Company

Norwalk Lock Company
South Norwalk, Conn.

Penn Metal Company
Cambridge, Mass.

Plymouth Cordage Company
North Plymouth, Mass.

Raybestos Company
Bridgeport, Conn.

Remington Arms Company
Bridgeport, Conn.
J. Merrill Richards Company  
Boston, Mass.

Riverside Boiler Works, Inc.  
Cambridge, Mass.

Scovill Mfg. Company  
Waterbury, Conn.

Lewis-Shepard Company  
Watertown, Mass.

Simonds Saw & Steel Company  
Fitchburg, Mass.

Smith Paper Company  
Lee, Mass.

Snell-Jones Tack Corporation  
Brockton, Mass.

Towle Mfg. Company  
Newburyport, Mass.

Union Twist Drill Company  
Athol, Mass.

Wolworth Company  
Boston, Mass.

Waterbury Farrell Foundry & Machine Company  
Waterbury, Conn.

Wellington, Sears & Company  
Boston, Mass.

Whiting Adams Company  
Boston, Mass.

Winchester Repeating Arms Company  
New Haven, Conn.

Yale & Towne Mfg. Company  
Stamford, Conn.
APPENDIX H

Non-Acceptors Replying to Questionnaires
NON-ACCEPTORS REPLYING TO QUESTIONNAIRES

Abrasive Machine Tool Company
Providence, R.I.

Acme Shear Company
Bridgeport, Conn.

Acme Wire Company
New Haven, Conn.

American Paper Tube Company
Woonsocket, R.I.

American Printing Company
Fall River, Mass.

Ashaway Line & Twine Mfg. Company
Ashaway, R.I.

Atlantic Chair Company
Gardner, Mass.

Atlantic Saw Mfg. Company
New Haven, Conn.

Automatic Machine Company
Bridgeport, Conn.

Walter Baker & Company,
Milton, Mass.

Barber Electric Mfg. Company
North Andover, Mass.

Bissell Varnish Company
Bridgeport, Conn.

Brewer & Company

Bridgeport Hardware Mfg. Company
Bridgeport, Conn.
Bridgeport Switch Company
Bridgeport, Conn.

Bundy Steam Trap Company
Nashua, N.H.

Columbia Nut & Bolt Company
Bridgeport, Conn.

Crane & Company
Dalton, Mass.

Curtis & Curtis Company
Bridgeport, Conn.

H.T. Cushman Mfg. Company
North Bennington, Vt.

Devis Mills
Fall River, Mass.

W.L. Douglas Shoe Company
Montello, Mass.

C.H. Dresser & Son
Hartford, Conn.

E. & T. Fairbanks & Company
St. Johnsbury, Vt.

Fales & Jenks Machine Company
Pawtucket, R.I.

Farrel Birmingham Company
Ansonia, Conn.

Fellows Gear Shaper Company
Springfield, Vt.

Fiberloid Corporation
Indian Orchard, Mass.

Firestone Footwear Company
Hudson, Mass.
Flash Chemical Company  
Cambridge, Mass.

H.D. Foss Company  
Cambridge, Mass.

French & Heald Company  
Meridith, N.H.

General Fibre Box Company  
West Springfield, Mass.

Gilbert & Barker Mfg. Company  
West Springfield, Mass.

Goodell Company, Inc.  
Antrim, N.H.

Goodell-Pratt Company  
Greenfield, Mass.

Graton & Knight Mfg. Company  

Hart & Hegeman Mfg. Company  
Hartford, Conn.

Hart & Hutchinson  
New Britain, Conn.

Hendey Machine Company  
Torrington, Conn.

Hobbs Mfg. Company  

Hood Rubber Company  
Watertown, Mass.

The E. Ingraham Company  
Bristol, Conn.

The Jacobs Mfg. Company  
Hartford, Conn.
Kendall Mills, Inc.
Walpole, Mass.

Kingsbury Box & Printing Company
Northampton, Mass.

A.J. Knott Tool and Mfg. Company
Milford, Mass.

Lamson & Goodnow Mfg. Company
Shelburne Falls, Mass.

Landers, Frary & Clark
New Britain, Conn.

Larson Tool & Stamping Company
Attleboro, Mass.

The Thomas Laughlin Company
Portland, Me.

A.C. Lawrence Leather Company
Peabody, Mass.

Lever Bros. Company
Cambridge, Mass.

The Lovejoy Tool Company
Springfield, Vt.

The Manning Bowman & Company
Meriden, Conn.

The Merrimac Hat Company
Amesbury, Mass.

Moore Drop Forging Company
Springfield, Mass.

Narragansett Machine Company
Pawtucket, R.I.

The National Equipment Company
Springfield, Mass.
New England Cable Company  
Concord, N.H.

North Wayne Tool Company  
Hallowell, Maine

Package Machinery Company  
Springfield, Mass.

Pairpoint Corporation  
New Bedford, Mass.

Pawtucket Sash & Blind Company  
Pawtucket, R.I.

Peck Stow & Wilcox Company  
Southington, Conn.

Pierce & Son,  
Gardner, Mass.

Pneumatic Scale Corporation  
Atlantic, Mass.

Porter Screen Company  
Burlington, Vt.

Potter & Johnston Machine Company  
Pawtucket, R.I.

President Suspender Machine Company  
Shelburne Falls, Mass.

Pressteel Engineering Corporation  
Derby, Conn.

Prophylatic Brush Company  
Florence, Mass.

Ready Tool Company  
Bridgeport, Conn.

Reed-Prentice Company  
Regal Shoe Company
Whitman, Mass.

C.M. & A.W. Rolfe Company
Hartford, Conn.

Royal Typewriter Company
Gloucester, Mass.

Russia Cement Company
Gloucester, Mass.

Rutland Sash & Door Company
Rutland, Vt.

Saco-Lowell Shops
Newton Upper Falls, Mass.

Saranac Glove Company
Littleton, N.H.

Skinner Chuck Company
New Britain, Conn.

Sigourney Tool Company
Hartford, Conn.

Simplex Time Recorder Company
Gardner, Mass.

Simplex Tool Company
Woonsocket, R.I.

A.G. Spalding & Bros.
Chicopee, Mass.

Somerville Brush Company
Somerville, Mass.

Standard Electric Time Company
Springfield, Mass.

Standard Engineering Company
Pawtucket, R.I.
Stedman Products Company
South Braintree, Mass.

The Strathmore Paper Company
Mittineaque, Mass.

Stetson Shoe Company
South Weymouth, Mass.

Sullivan Machinery Company
Claremont, N.H.

Taft-Pierce Mfg. Company
Woonsocket, R.I.

New Bedford Copper Company
Taunton, Mass.

Terry Steam Turbine Company
Hartford, Conn.

Henry G. Thompson & Son Company
New Haven, Conn.

Turner Tanning Machinery Company
Peabody, Mass.

Veeder Mfg. Company
Hartford, Conn.

U.S. Envelope Company
Springfield, Mass.

Warren Leather Goods Company

Wells & Richardson
Burlington, Vt.

Whitin Machine Works
Whitinsville, Mass.

Whittemore Bros. Corporation,
Cambridge, Mass.
Whittemore Bros. Corporation
Cambridge, Mass.

Wirewold Company
Hartford, Conn.

Woonsocket Brush Company
Woonsocket, R.I.
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