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HOW THE PAPER INDUSTRY AND ITS ASSOCIATED INDUSTRIES
VIEW METRICATION AND STANDARDIZATION

by

David H. Evaul

A Thesis submitted to the
Faculty of the Department of Paper Technology
in partial fulfillment
of the
Degree of Bachelor of Science

Western Michigan University

Kalamazoo, Michigan

April 1973

ABSTRACT

The purpose of this thesis is to indicate the reactions of the paper industry and its associated industries to metrication, standardization, and their effects on the industry. In this thesis a history of the metric system is given. The metric system, as it relates to the paper industry and its associated industries, is discussed. To get direct views on how the paper manufacturers, paper merchants, and printers felt about metrication and standardization a survey was made. From this survey, the questionnaires returned indicated that the majority of the paper manufacturers, paper merchants, and printers were mildly in favor of metrication and standardization and would be able to make the changeover in from five to ten years. The advantages of simplification under the metric system seemed to be great enough to overcome the problems of conversion.

TABLE OF CONTENTS

	PAGE
INTRODUCTION.	1
THE METRIC SYSTEM	2
History of System.	2
In Relation to the Paper Industry and its associated Industries	3
RESULTS OF SURVEY	8
From Paper Manufacturers	8
From Paper Merchants12
From Printers.14
CONCLUSIONS17

INTRODUCTION

The bill to set about the standardization (standards based on metric units) of the United States' weights and measures through the International System of units, also known as the metric system, passed the Senate of the United States as of August 18, 1972. It appears this bill will pass the House of Representatives during 1973. The bill calls for a voluntary changeover from our customary or "English" system to the metric system which would evolve in ten years and would be overseen by a Board made up of representatives of industry, trade associations, government appointees and other groups.

The metric system consists of these six basic units:

Time	-	second
Temperature	-	kelvin
Length	-	meter
Mass	-	kilogram
Volume	-	liter
Electric current	-	ampere

Assuming the bill passes, the paper industry and its associated industries will have a problem on its hands, despite the fact that the conversion to the metric system would be voluntary.

To get the paper industry and its associated industries' reaction to the idea of changing to the metric system and to the effects metrication and standardization would have on them, I conducted a survey. The results of this survey

involving paper manufacturers, paper merchants and printers are shown in the body of this paper.

THE METRIC SYSTEM

HISTORY OF SYSTEM

France was the first country to use the metric system which they adopted in 1790. Germany started using the metric system in 1872. The Chinese went metric after World War II and the Japanese followed suit ten years ago. England is more than halfway through its ten year program. The Canadians, Australians and twenty-one other nations have just started to go metric. The Australians have issued postage stamps, depicting cartoon characters with metrication problems, to help in educating their people in the metric system. Nine-tenths of the world now uses the metric system. Only ten small underdeveloped nations have held out along with the United States. (1) For the past one hundred and eighty years the United States Congress has turned down several proposals for the adoption of the metric system. The first time was in 1790 when Thomas Jefferson devised a new "foot" based on ten new "inches". Although President Washington urged the adoption of the system the "Do nothing Congress" failed to adopt it. However, in 1785 Jefferson's decimal system of currency was adopted. Again in 1821, Secretary of State John Quincy Adams suggested to Congress that the United States adopt the metric system of weights and

measures but Congress failed to do so.

In August 1968 the metric study bill was signed into law. This study was made by the Metric System Study Group in the Bureau of Standards under Public Law no. 90-472 and completed in 1971. The metric study bill was the first full scale investigation of the country's weights and measures. This study recommended that the United States change to the International Metric System. (2) The Senate of the United States has finally decided that the country should convert its commonly used weights and measures from the traditional or "English" system to the metric system. On August 18, 1972 the Senate approved bill S. 2483, the Metric Conversion Act of 1972. This bill is expected to go before the House of Representatives in 1973. (3)

IN RELATION TO THE PAPER INDUSTRY AND ITS ASSOCIATED INDUSTRIES

Dr. Lewis M. Branscomb, director of the Bureau of Standards, points to the fact ". . . that the industrialized nations were in the process of drawing up an international set of industrial standards of weights and measures . . ." and that it would be to the United States' advantage to have a part in establishing these standards. (4) Bringing the United States in line with the rest of the world in terms of the interchange of manufactured products will require an agreement on internationally accepted standards. Before metric parts and materials can be pro-

duced, metric standards for these parts and materials must be developed. (5) A standard size is something a manufacturer or a national or worldwide industry adopts to simplify engineering, reduce manufacturing costs, provide interchangeability and reduce warehousing and spare parts. (2)

The American Paper Institute at the second National Metric Study Conference on September 23, 1970 stated, in closing, "The United States cannot remain an island of obsolete and cumbersome measuring system in the world. It must convert sometime to the more sensible measurement; it should have long ago and every year it is put off will cost us more." (6) It seems we are now about to make the metric change as initiated by the Metric Bill of 1972. As a whole the changeover will be a costly one. Costly because of the time involved and the number of things needed for the changeover. In the paper industry and its associated industries the present machinery will obviously not be scrapped. Only those parts essential to making conforming products will be necessarily changed. Gauges would be changed to readout in metric units. In general, the conversion to metric dimensions of materials made in sheets - metals, plastics, paper, plywood, etc. - will be relatively simple. Thickness can be changed merely by adjusting rollers, width and length by recalibrating gauges and measuring devices. (5) The industry will

have to educate its personnel and do it as a part of a general metrication plan. In setting up a changeover the main rule should be, "Do not convert to the metric system, learn it new. Learn it by association." (7) However, existing drawings, tools and parts will be converted and two lists are suggested: 1. an abbreviated list for immediate use and 2. a complete list for later use. There is a suggested plan for smooth conversion by ASME (American Society of Mechanical Engineers) (7) shown in Exhibit I.

The maximum advantage of "going metric" can be achieved by standardization simplification. Standards and standard products in the paper industry and its associated industries today are the result of years of customs, the English measuring system, and in some cases necessity which hasn't existed for many years. With metrification the paper industry and its associated industries will be given a chance to simplify its standards and standard products in a logical and intelligent manner. If these standards are made in that way, and when they are learned and accepted they will save the paper maker time and money every day of operation. Standardization may now mean joining a great part of the world with ISO (International Organization for Standards) standards. To do this would propogate a world market, giving the paper industry and its associated industries a larger buying and selling place to its advantage. For this purpose the United States must increase its participation in IEC (International Electrotechnical Commission) and ISO to have a say in the international

standards. (6) The paper industry has a line to ISO and IEC through ANSI (American National Standards Institute) which is in WG (1) (working group No. 1) of ISO/TC6 (Technical Committee). Tappi is a member body of ANSI. ANSI does not develop standards; rather, it cooperates with standards - developing organizations to help identify a standards need, to provide a neutral forum to insure consumer and public representation and review. (8) WG (1) is a working group suggesting to ISO/TC6. The ISO/TC6 of the International Standards Organization has six sub-committees: 1. nomenclature and definitions 2. paper testing 3. dimensions 4. packaging 5. pulp testing and 6. postal use. (6) For paper sizes it is being suggested that the United States go to ISO standard sizes of series A and B and series C for envelopes. The standard area for calculating basis weight is the square meter.

Standardization, to be beneficial, should be concentrated on the areas of production, distribution and marketing which lend themselves to simplification rather than product specification and complication. (7) The industry should be going toward simplification with its standardization not complicated regimentation. The paper industry and its associated industries, therefore, has its major problem in standardization and its planning.

The paper industry and its associated industries should start to initiate its own programs toward standardization and the sooner the better. Ford Motor Company is already

making their Pinto for 1973 to metric specifications. This kind of forward thinking will save losses in the future and make them profit more quickly from the changeover.

Another problem facing the paper industry and its associated industries is coordinating its metrication and standardization plan with its producers and consumers. It will be easy enough to accept the machining metrification as it comes about but there will be a required time for coordination between the consumers and the paper industry and its associated industries.

RESULTS OF SURVEY

FROM PAPER MANUFACTURERS

Sixty letters and questionnaires (see Exhibits No. II and III) were sent to paper manufacturers and thirty-two questionnaires were returned. Forty percent of those returning the questionnaire said they were mildly in favor of metrication while thirty percent reported they were neutral in their attitude toward metric usage. When asked if they were in favor of standardization (standards based on metric units) many confused the definition of standardization with that of metrication. Part of the point of this question was to find out if there was confusion as to what standardization meant. However, sixty-six percent of those returning the questionnaire indicated they were in favor of standardization. I received one fine definition of standardization for the paper industry from John Studeny, Vice President of Hammermill Paper Company which read, "Standardization can refer to a) grade or product classification or nomenclature, b) basis weights, c) paper sizes, d) colors, finishes, coatings, e) physical quality specifications (product standards), f) test methods, g) packaging, and h) marketing practices". Those in favor of standardization seem to see metrication as a help in bringing about standardization. Paper would be sold as grams per square meter (g/m^2) rather than the

present "pounds per ream" or "pounds per square foot". This would be a primary requirement for standardization. As for economic problems arising from metrication and standardization sixty-six percent thought there would be problems. Among the economic problems foreseen were methods of marketing, promotional materials, purchasing, labels, instrumentation, duplication, confusion, dual inventories, training employees, reequipping engineers, tradesmen and operators with conversion charts and training aids, refitting equipment with conversion settings or dials, trim efficiency of paper machines affected by changes in paper sizes, and the cost of new measuring and weighing equipment which could not be standardized to the new system. Next, sixty-six percent felt that the cost of metrication and standardization over the next ten years would not be justified by simplification and its cost savings. Seventy percent said they would not require government financing or loans to complete their changeover. Sixty-four percent felt that much of the changeover would come as normal retoolings or design changes without added cost. Sixty percent were in favor of increased participation in ANSI, WG 1, ISO, and IEC as a means to standardization but, surprisingly, quite a few were not familiar with these organizations. As to the tools they would use in implementing the metric system

and standardization, fifty percent did not know at this time and fifty percent listed tools they planned to use. Among the tools listed were forming a corporate task force made up of representatives from personnel, research and engineering, manufacturing, purchasing, and marketing; establishing time tables and conducting training sessions resulting in creating an atmosphere of "metric thinking"; converting charts, rulers, tapes and weighing scales; dual dimensions on drawings; and keeping abreast of a customer's needs through marketing. Only six percent had formed a group to work on conversion to metric standards of measurement. Fifty percent thought A.P.I. (American Paper Institute) should represent the paper industry when and if a Board is set up to oversee the changeover to the metric system and fifty percent thought Tappi should represent them. Eighty-five percent thought there should be an industry plan, rather than an individual company plan, in converting to the metric system. There were many varying answers as to how long it would take their individual company or the paper industry as a whole to make the changeover to standardized metric products. Some thought it would take as long as a generation but sixty percent thought it would take from five to ten years. Thirty percent thought their consumers would be ready for standardized metric products in five to ten years. However, others thought their consumers would be

ready as the products became available if the industry, as a whole, would make an effort to inform and educate the consumers, otherwise they would not take the time to comprehend what the new system was all about. As for the suppliers, again thirty percent thought it would take five to ten years for them to be ready for standardized metric products. Others thought the suppliers would be ready whenever the paper mills were. Sixty-six percent thought it would be advantageous for their company to convert to the metric system. The following are some of the advantages they foresaw. A decimal system would be more simple and logical. Simplicity of calculations and the use of common units with the rest of the world would help in communication. There would be economic advantages in marketable sizes as conversion takes place if an industry is well prepared. The prepared supplier would be able to guide customers undergoing conversion to their mutual advantage. It would be an advantage to share in universal markets while using a system that is comparable to most of the world. Manufacturers and consumers would be able to reduce inventories in the long run. There would especially be less variety in items such as nuts, bolts, and other hardware. There would be simplified engineering calculations and internal accounting. Sizes of paper and related products could be simplified. This is where standardization becomes particularly beneficial. Another advantage would be the increase in

paper sales because of reprinting of printed material that makes reference to measures.

FROM PAPER MERCHANTS

Seventy-two letters and questionnaires (see Exhibit Nos. II and IV) were sent to paper merchants and twenty-two questionnaires were returned. Seventy percent of those returning the questionnaire said they were in favor of standardization. When asked the present attitude of their company toward metric usage thirty percent reported they were strongly for it. Some felt they would have to go along with the manufacturers as they were only distributors. Seventy percent felt there would be economic problems resulting from metrication and standardization. Some of the economic problems foreseen were: converting equipment for weighing and cutting paper; re-educating employees and customers; new price lists, packing slips, labels and invoices; dual inventories; promotion and advertising. Fifty percent said that the cost of metrication and standardization to their company over the next ten years would be justified by simplification and its cost savings, while fifty percent said it would not. Only twelve percent were in favor of increased participation in ANSI, WG 1, ISO and IEC while fifty percent were unfamiliar with these organizations. As for the tools they would use in implementing the metric system and standardization fifty percent listed tools they planned to use

Among the tools listed were training employees and customers, labeling paper in both metric and English units, placing large metric charts on walls of working areas and having dual metric-English rules for employees.

Eighty percent thought there should be an industry plan, rather than an individual company plan, in converting to the metric system. Forty percent thought A.P.I. should represent the paper industry when, and if, a Board is set up to oversee the changeover. About forty percent thought it would take from one to five years for their company or the paper industry to complete the changeover to standardized metric products. When asked when they thought their consumers would be ready for standardized metric products almost all gave a different answer. Their answers ranged from immediately to two generations from now. When asked when their producers would be ready to supply standardized metric products forty percent said the suppliers would be ready in five years. Seventy percent thought it would be advantageous for their company to convert to the metric system. Some of the advantages they listed were: consistency in language, resulting in reduced wording on purchase orders and in quoting and billing; growth in export sales; ease of mathematical calculations; speedup and simplification of all pricing and accounting; and having a complete standardization of sizes and weights for the entire paper industry. When

asked how they planned to coordinate their efforts, to convert to the metric system, with their consumers and producers seventy percent had no plans. Some of the plans the remaining thirty percent had were to assist in educating their consumers by using comparison charts and dual labels and to follow the procedure their mill suppliers dictate. When asked if they favored the ISO standard A, B, and C paper sizes as used in Europe twenty-seven percent answered yes, twenty-three percent answered no and fifty percent had never heard of these paper sizes.

FROM PRINTERS

Eighty-four letters and questionnaires (see Exhibit Nos. II and V) were sent to printers and twenty-two questionnaires were returned. About thirty percent of those returning the questionnaire said their company was "strongly for" metrication. After I received Mr. Studeny's definition of standardization I included it in my questionnaire sent to the printers since they were sent out at a later date. Ninety-one percent said they were in favor of standardization. As to what extent they favored standardizing paper the answers given most often were: grade, paper sizes, nomenclature, basis weights, test methods and packaging. Fifty percent thought there would be economic problems arising from metrication. Among the economic problems foreseen were: dual inventory on nuts, bolts, tools and spare parts; training of personnel;

errors due to confusion; each maintenance crew would need one English and one metric tool box; and conversion of all drawings and specifications. Fifty percent thought the cost of metrication and standardization to their company over the next ten years would be justified by simplification and its cost savings and fifty per cent did not think it would be justified. Eighty-five percent said they would not require government financing or loans to complete their changeover. As to the problems they would have in retooling only twenty percent said they would have problems. Some of the problems listed were: having to duplicate calibration scales; input information, specifications and materials from customers; and organizing the phases of changes so that the industry converts in concert. Many thought there would be no need for retooling because most of their equipment was made in Europe. Twenty percent thought there would be problems in metrication and standardization of paper in the printing industry. Among the problems named were: communication; training people to think "metric"; psychological, as older people would not want to change; book publishers would not want to go into a costly conversion on reprints; and gauges on equipment such as cutters and folders would have to be changed. Fifty percent thought that the changeover would come as normal retoolings or design changes without added cost. Eighty percent indicated what

tools they would use in implementing the metric system and standardization in their company. The tools listed were: training of employees; maintaining a double standard on nuts, bolts, spare parts and tools for as long as it was necessary; large conversion charts; new measuring devices on machines; rules and calipers using the metric units and new equipment specifications, service manuals, price lists, spare parts schedules and reference books. Forty percent thought the P.I.A. (Printing Industry of America) should represent the printing industry when, and if, a Board is set up to oversee the changeover to the metric system. Seventy percent thought there should be an industry plan in converting to the metric system rather than an individual company plan. A majority of the printers thought the changeover and standardization would take two to five years for their individual company, five to ten years for the paper industry and two years for the printing industry. Almost fifty percent thought their consumers would be ready at anytime but that their producers would not be ready for at least five years. When asked if they thought it would be advantageous for their company to convert to the metric system more than fifty percent felt that it would. Advantages they could foresee were: having worldwide thinking in the same terms would be helpful to companies involved

in international trade; the use of ISO standards would simplify estimating and inventory control; using tenths with the increasing use of calculators and computers; all existing literature dealing with specifications, labels, etc. would have to be replaced thereby increasing the printer's business. Internally it would tend to simplify the various systems (inches, points, metric, etc.) already in use and make everyone able to relate one unit of value to another more easily.

CONCLUSIONS

In summarizing the results of my survey, I found that the majority of paper manufacturers, paper merchants, and printers were in favor of metrication and standardization and would be able to make the changeover to the metric system in from five to ten years. They would not require any government financing or loans to complete the changeover and they preferred an industry plan as opposed to an individual company plan in converting to the metric system. The paper manufacturers and merchants wanted A.P.I. to represent them if, and when, a Board was set up to oversee the changeover. The printers preferred to be represented by P.I.A.

The main tools the paper manufacturers, paper merchants and printers would use in implementing the metric system would be educating personnel and customers;

conversion charts, rules, tapes and weighing scales; labeling paper in both metric and English units; placing large metric charts on wall of working areas; maintaining a double standard on nuts, bolts, spare parts and tools for as long as necessary; providing personnel with rules and calipers using the metric units; and new equipment specifications, service manuals, price lists, spare parts schedules and reference books.

Training of personnel would be the most formidable problem facing the industries during the metric conversion. Other economic problems would be the cost of new weighing and measuring equipment which could not be standardized to the new system; converting (when possible) equipment already in use with conversion settings or dials; maintaining accurate inventories; reequipping engineers, tradesmen and operators with conversion charts and training aids; and the cost of new price lists, packing slips, labels, and invoices.

In converting to the metric system the paper manufacturers, paper merchants, and printers could see many advantages. Simplification seemed to be the foremost advantage. The simplicity of calculations; inventories; communication; accounting; having a complete standardization of sizes and weights; being able to use tenths with the increasing use of calculators and computers would all be advantages.

The printers were more unanimous in their favoring of metrication and standardization. One can easily see why, as it would be a good chance for the printing industry to increase its business. This increase would come about because a large amount of printed material would have to be reprinted for educational purposes and for materials referring to measures. However, if the business of the printers increased so would that of the paper manufacturers and merchants. This increase in sales would also be an advantage.

The changeover cost should not be too great if companies continued the use their present machines while converting equipment and printing press widths. When new machines were ordered they would be designed to accommodate the new paper sizes. For a time inventories would be larger but as most of the equipment became geared to the new standard sizes, then inventories could become smaller than ever before. In the long run this could result in a savings.

It seems that the advantages of metrication and standardization would be great enough to overcome the problems of conversion if the industry is well prepared and the phases of change are organized so that paper manufacturers, paper merchants, and printers convert in a well planned manner.

LITERATURE CITED

1. Edson, Lee, "Metrication", American Education, Vol. 8, no. 3, April, 1972, pp. 10,11.
2. "The Metric System: Our Readers Speak Out", The Saturday Evening Post, Summer, 1972, pp. 159,160.
3. "Metric Bill Finally Voted", Science News, Vol. 102, no. 9, August 26, 1972, p. 132.
4. "Metrication's Justification", Consumer Bulletin, Jan. 1972, pp. 35,36.
5. Donovan, Frank, Prepare Now for a Metric Future, Weybright and Talley, New York, N.Y., 1970 p. 189.
6. Branscomb, L.M., "A Metric America - and the Paper Industry", Tappi, TS 1080 T3, Aug., 1972.
7. Featherly, W.A., "Steps in Preparing a Metrification Program in a Company", The American Society of Mechanical Engineers, Aug. 11, 1972.
8. Trowbridge, Roy P., "The role of the American National and Internal Standards", Tappi, TS 1080 T3, Aug. 1972.

EXHIBIT I

The following procedure is set forth as a guide toward accomplishing as efficient a changeover in industry as possible.

Educational session

- 1) Familiarization
 - a) History of system
 - b) Why change
 - c) Time table for U.S. change

- 2) Individual involvement
 - a) Company program - company schedule for changeover
 - I. Physical examples
 - II. Charts
 - III. Conversion lists
 - b) Problems in metric system
 - c) Problems in converting

Next you need your supplier's time table and your customer's needs. So now you set your plan accordingly.

- 1) Drafting
 - a) Early basic knowledge
 - b) Tolerances

- 2) Design Engineering
 - a) Basic knowledge
 - b) Tolerance & conversion
 - c) Vendor's time table
 - d) Company's time table

- 3) Industrial Engineering
 - a) Basic knowledge
 - b) Vendor's time table
 - c) Company's time table

- 4) In plant tool making
 - a) Tolerance & conversion
 - b) Existing equipment changeover
 - c) Vendor's time table
 - d) Company's time table

- 5) Quality control (inspection)
 - a) General knowledge
 - b) Tolerance
 - c) Customer's time table
 - d) Equipment changes - gauges

EXHIBIT I - continued

- 6) Styling
 - a) General knowledge
 - b) New modules
 - c) Long styling leads
- 7) Receiving - inspection
 - a) General knowledge
 - b) Vendor's time table
- 8) Buyer
 - a) General knowledge
 - b) Vendor's time table
- 9) Scheduling
 - a) General knowledge
 - b) Company's time table
 - c) Vendor's time table
- 10) Manufacturing
 - a) General
 - b) Company time table
- 11) Personnel
 - a) General
 - b) Company
- 12) Accounting
 - a) General
 - b) Company
- 13) Data Processing
 - a) General
 - b) Company
- 14) Marketing
 - a) General
 - b) Company
 - c) Customer's time table

January 30, 1973
9133 West End
Portage, Michigan
49081

Gentlemen:

I am involved in writing a senior thesis at Western Michigan University for my B.S. in Paper Engineering. The project has been designed to deal with metrication and standardization in the paper industry and its associated industries. The examination of problems that will arise through metrication and standardization will be done through surveys such as the enclosed questionnaire and personnel contact with the industries when possible. The idea for this thesis was brought about by the passage of a bill by the U.S. Senate to provide for the voluntary conversion to the metric system of weights and measures. Assuming that this bill passes the House sometime this year, as the experts predict, the paper industry and its associated industries will be forced to convert to the metric system and will be able to simplify through standardization.

The enclosed questionnaire is proposed to help me complete my survey and thereby my thesis. I would appreciate it if you would complete the questionnaire and return it to me as soon as possible. Also, any further comments or correspondence related to my project would be greatly appreciated.

Very truly yours,

Enclosure

David H. Evaul

^aThis letter was sent to paper manufacturers, paper merchants, and printers.

QUESTIONNAIRE

1. In reference to standardization - are you in favor of it? _____
If so, to what extent are you in favor of standardizing paper?

2. Do you foresee any economic problems from metrication? _____
Standardization? _____. If so, what would the problems be?

3. Will the cost of metrication and standardization to your company over the next ten years be justified by simplification and its cost savings? _____

4. Will you require government financing or loans to complete your changeover? _____

5. Do you think that much of the changeover would come as normal retoolings or design changes without added cost? _____

6. Are you in favor of increased participation in ANSI (American National Standards Institute) → WG 1 (working group No. 1) → ISO (International Organization for Standards) and IEC (International Electrotechnical Commission) as the means to standardization?

7. What tools will you use to implement the metric system and standardization in your company?

Have you formed a group to work on conversion to metric standards of measurement? _____

8. When a Board is set up to oversee the changeover to the metric system, who do you think should represent the paper industry?

^bThis questionnaire was sent to paper manufacturers.

9. Do you think there should be an industry plan in converting to the metric system or should the plan be left to the individual companies?
10. How long do you think the changeover and standardization will take for your company? _____
How long for the paper industry _____
11. When do you think your consumers will be ready for standardized metric products?
12. When do you think your producers will be ready to supply standardized metric products?
13. Do you feel it would be advantageous for your company to convert to the metric system? _____. If so, what advantages do you foresee?
14. Which of the following is the present attitude of your company toward metric usage?
- | | |
|-----------------|---------------------|
| a) strongly for | d) strongly opposed |
| b) mildly for | e) mildly opposed |
| c) neutral | |

8. How long do you think the changeover and standardization will take for your company? _____
How long for the paper industry? _____
9. When do you think your consumers will be ready for standardized metric products?
10. When do you think the producers will be ready to supply standardized metric products?
11. Do you think the expense and trouble involved in the changeover to the metric system is too great? _____
12. Do you feel it would be advantageous for your company to convert to the metric system? _____. If so, what advantages do you foresee?
13. Which of the following is the present attitude of your company toward metric usage?
- a) strongly for
 - b) mildly for
 - c) neutral
 - d) strongly opposed
 - e) mildly opposed
14. How are you planning on coordinating your efforts to convert to the metric system with your consumers and producers?
15. Are you in favor of the ISO standard A, B & C paper sizes as used in Europe? _____

EXHIBIT v^d
QUESTIONNAIRE

1. In reference to standardization - are you in favor of it? _____

If so, to what extent are you in favor of standardizing paper? Check appropriate ones -

- | | | |
|---|--|------------------------------|
| A. Grade ____, product classification ____, or nomenclature ____. | D. Colors ____, Finishes ____, Coatings ____. | F. Test methods ____. |
| B. Basis weights ____. | E. Physical quality specifications (product standards) ____. | G. Packaging ____. |
| C. Paper sizes ____. | | H. Marketing practices ____. |

2. Do you foresee any economic problems from metrication? _____
(Metrication is the changeover of units to the metric system from our present system). If so, what would the problems be?

3. Will the cost of metrication and standardization to your company over the next ten years be justified by simplification and its cost savings? _____
4. Will you require government financing or loans to complete your changeover? _____
5. What problems do you foresee in retooling in the printing industry? (to meet with the metrication bill)

What problems do you foresee in metrication and standardization of paper in the printing industry?

6. Do you think that much of the changeover would come as normal retoolings or design changes without added cost? _____
7. What tools will you use in implementing the metric system and standardization in your company?

^dThis questionnaire was sent to printers.

8. When a Board is set up to oversee the changeover to the metric system, who do you think should represent the printing industry?
9. Do you think there should be an industry plan in converting to the metric system or should the plan be left to the individual companies?
10. How long do you think the changeover and standardization will take for your company? _____
How long for the paper industry? _____
How long for the printing industry? _____
11. When do you think your consumers will be ready for standardized metric products?
12. When do you think your producers will be ready to supply standardized metric products?
13. Do you feel it would be advantageous for your company to convert to the metric system? _____. If so, what advantages do you foresee?
14. Which of the following is the present attitude of your company toward metric usage?
- | | |
|-----------------------|---------------------------|
| a) strongly for _____ | d) strongly opposed _____ |
| b) mildly for _____ | e) mildly opposed _____ |
| c) neutral _____ | |