1976

Investigating Methods of Accelerating the Seasoning of Wood Blanks for Bowl Turning

Myron W. Curtis
Old Dominion University

Please return to:

Dr. David I. Joyner
Industrial Arts Department
Old Dominion University

INVESTIGATING METHODS OF ACCELERATING THE SEASONING OF WOOD BLANKS FOR BOWL TURNING

A Research Paper

Presented to

Dr. Alan Mandell
School of Education
Old Dominion University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Secondary Education

---

by

Myron W. Curtis

May, 1976

APPROVAL SHEET

This research paper was prepared by Myron W. Curtis under the direction of Dr. Alan Mandell, Professor of Education. It was completed as a course requirement for Education 536, Problems in Education, and was submitted as a partial fulfillment for the Degree of Master of Science in Secondary Education.

Dr. Alan Mandell
Graduate Program Director

Myron W. Curtis
Researcher

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

A popular part of woodworking has been the wood lathe where a majority of students have tried their hands at making a bowl, lamp, or other turned project. With the lathe performing the labor, a bowl was an excellent method of teaching machine woodworking. This combination of learning and popularity produced a demand for bowl blanks that was difficult to fulfill, and the cost was often prohibitive.

Two types of bowl blanks have generally been associated with wood turning. These types were: (1) solid blanks cut from a single piece of wood, and (2) laminated blanks made by gluing together two or more pieces of wood.

Both types had distinct advantages and produced satisfactory bowls. The solid blank produced a bowl of superior aesthetic quality. A solid blank required less preparation time and could be turned without risk of joint separation of delimitation. The laminated blank provided an excellent opportunity to utilize shorts and scrap wood which would otherwise be discarded. The laminating of blanks was an excellent method of teaching joint preparation and gluing.

Solid blanks were preferred to laminated blanks because of the extensive time saved by the elimination of joint preparation and gluing. The problem was the availability or procurement of properly seasoned solid blanks of desired specie and size at an acceptable

cost. To increase the availability, some method of seasoning wood was needed to produce acceptable blanks from readily available unseasoned wood.

THE PROBLEM

Statement of Problem

The purpose of the study was to establish through experimental research an improved method of accelerating the seasoning of bowl blanks. Specifically, the study was conducted to determine.

1. Whether a worthwhile method or methods were available for accelerating the seasoning of wood bowl blanks.
2. Whether the blanks were of suitable quality
3. Whether the method or methods present a worthwhile learning experience
4. Whether the unseasoned wood and the equipment used in seasoning were available, safe, and within reasonable financial means

The following null hypothesis was suggested:

The methods used will cause no significant acceleration of the seasoning of bowl blanks.

Importance of the Study

The availability of wood suitable for bowl turning has decreased while its cost has more than doubled. For example, the average cost of oak, maple, or cherry has increased from fifty cents to one dollar per board foot.

In contrast, much of the wood cut or removed in land clearance

was either sold as firewood, burned, buried, or left to rot. This wood even purchased as firewood at a cost of six cents a board foot would be available for bowl blanks if a suitable seasoning method were available.

Delimitations of the Study

The study was limited to: (1) Tidewater, Virginia; (2) data received from teachers from the Norfolk and Virginia Beach public school system; (3) an ERIC search, including RIE and CJIE, and a search of the Department of Agriculture's data base (CAIN) on the topics of acceleration of wood seasoning; and (4) books, periodicals, and research specifically concerned with accelerated wood seasoning. One further limitation was the inconsistency in levels of cooperation and resulting accuracy of teachers assisting with the study.

THEORETICAL FRAMEWORK

Definitions of Terms

Air dried. A slow process whereby the wood is stacked in courses on sticks and allowed to dry in the open air.

Anisotropic. Meaning to shrink unevenly along different axes.

Bowl Blanks. A block of wood of a size suitable for turning a bowl.

Board foot. A section of a board one inch by one foot by one foot or the equivalent.

CAIN. Cataloging and indexing data base produced by the National Agricultural Library.

CIJIE. Current Index of Journals in Education

ERIC. Educational Resources Information Center

Finished turning. The second or post-seasoned turning of the bowl to its finished shape.

Hygroscopic material. Absorbing or discharging moisture to the air.

Kiln dried. Forced drying of wood by the control of the amount of temperature and humidity in an oven.

Laminating. To build up by layers, joining, two or more pieces of wood by gluing.

Longitudinal axis. Axis parallel to the grain in the wood.

Microwave oven. An oven using electromagnetic waves of extremely high frequency.

Polyethylene glycol. A wax-like cell bulking agent with a molecular weight of 1,000.

Radial Axis. The axis perpendicular to the grain, the longitudinal axis and the annual rings.

RIE. Resources in Education, a monthly publication of ERIC.

Rough Turning. The first turning of the unseasoned blank to a wall thickness which will accomodate uneven shrinking of the blank while seasoning.

Tangential axis. A curved line following an annual ring in a plane perpendicular to the length of the tree.

Wood seasoning. The process of removing excess moisture from wood.

Wood turning. The forming of wood articles upon a lathe.

ORGANIZATION OF THE STUDY

Chapter 1 contained an introduction to the study. Included were a statement of the problem, the importance of the study, delimitations of

the study, definitions of terms, and the organization of the study. In chapter 2 a review of related research and literature was reported. Chapter 3 contained the research methodology. In Chapter 4 the analysis of the data was presented. Chapter 5 contained a summary, findings, conclusions, and recommendations for further study.

CHAPTER 2

REVIEW OF RELATED RESEARCH AND LITERATURE

Wood as it comes from the tree contains as much as 100 or 200 percent of water in terms of its ovendry weight. The water, or moisture, exists as (1) free moisture in the cavities (Lumina) of the cells or as (2) bound moisture in the cell walls. In the drying process the free moisture leaves first. When the free moisture has left the wood is said to be at the fiber saturation point. This is the point at which the wood begins to shrink.

As the bound moisture leaves the cell walls, the cell shrinks causing that portion of the wood to shrink. Because the anisotropic nature of wood shrinking is not equal in all directions,[1] the shrinkage along the grain is negligible. The shrinkage across the grain is considerable and about twice as much in the tangential as in the radial direction. This inequality in shrinkage in three directions at right angles to one another sets up strains which cause the splitting, cracking, and checking which renders unseasoned wood virtually useless for bowl turning.

Wood is a hygroscopic material causing it to lose or gain moisture from the air depending upon the relative vapor pressure in the

---

[1]Panshin, J.A., and Carl deZeeuw. Textbook of Wood Technology, New York: McGraw-Hill Publishing Company.

surrounding air. A state of balance is obtained in the exchange of moisture called equilibrium moisture content. At this point the wood is ready to be used for bowl turning and is at a seasoned state.

Under normal conditions the drying time for a log is so extensive that the log may decay before it becomes seasoned. The same applies to boards and timbers unless some method is utilized to expose the wood to the air for seasoning. Two commonly used methods are air drying and kiln drying.

Air drying is a slow process whereby the wood is stacked and allowed to dry in the open air. Kiln drying is forced drying by control of the amount of temperature and humidity in the oven.[2] Air drying has the advantage of economy while kiln drying has the advantage of time. In practice, blanks for bowl turning usually are air dried; kiln drying being limited to two inch stock due to degrading in the kiln. A rule of thumb for air drying lumber is "one year per inch of thickness," requiring years to season bowl blank stock along with the checking which invariably occurs.

To reduce the time element and the problem with checking has been the object of much research. One method used under suitable conditions is the cell bulking agent polyethylene Glycol 1000.[3] The object is machined from an unseasoned blank, treated in the solution (30% by weight polyethylene Glycol) for approximately twenty one days. The object is then finish-machined and sealed with a polyurethane resin.

---

[2]Murphey, Wayne K. and Richard N. Jorgensen. Wood as an Industrial Arts Material. New York: Porgamon Press, Inc.

[3]Varossieau, W.W.; Forest Products Research and Industries in the United States.

This process does not lend itself to occasional use. Varossieau also lists: (1) Chemical seasoning, (2) Solvent seasoning, (3) Boiling in oil, (4) Superheated steam, (5) Vapor drying, (6) Vacuum drying, (7) Infrared radiation, and (8) High frequency dielectric heating. Varossieau states that none of these methods can be expected to replace air drying or kiln drying to any considerable extent. However, one method, high frequency dielectric heating, should lend itself well to bowl drying due to the availability of the home microwave oven. Part of this research will be devoted to the microwave oven.

Peters suggests rough turning the unseasoned blank to a wall thickness of about one inch, air drying for six weeks, then finish turning in the usual manner.[4] Pain also suggests the use of "wetwood" by the double turning method.[5] This author has experimented during the past ten years with a double turning method, and, finding it practical, will apply the major part of this research in this direction.

Tohline places his blanks in plastic bags, removes them at regular intervals, wipes them with a towel, turns the bag inside out and replaces the blank in the bag.[6]

Lammers places his blanks in a covered container filled with "woodlife," a wood preservative, for a period of twelve to twenty days and utilizes the double turning method.[7]

---

[4]Peters, Geoff, Wood Turning; Arc Books.

[5]Pain, F. The Practical Wood Turner. London: Drake Publishers, Ltd.

[6]Tohline, Max B. Weston, Conneticut

[7]Lammers, Charles M.; Norfolk, Virginia

Nohr coats the edge grain of his blanks with paraffin, wraps each blank in kraft paper and stores them for a period of six months to three years.[8]

SUMMARY

Conversations with these and other craftsmen indicates any and all information regarding efforts to accelerate the seasoning of bowl blanks is committed to memory. Further, the time involved in research to produce a comprehensive paper is not available to them. This paper therefore will confine itself to one specie and size of blank, the double turning method, and utilize the microwave oven and air drying, all available to the average student or craftsman.

---

[8]Nohr, Harry; Mineral Point, Wisconsin.

CHAPTER 3

RESEARCH METHODOLOGY

This research examined and reported on attempts to experimentally accelerate the seasoning of wood. The experiment involved the collection and analysis of data supplied by participating industrial arts teachers from the Norfolk and Virginia Beach public school systems. Eleven teachers and thirty-one students were involved. The data supplied by the study participants was compiled, studied, analyzed, and evaluated in terms of the stated null hypothesis.

DEVELOPING THE EXPERIMENT

The experiment evolved as a continuation of the researcher's interests and experiences as a woods technologist and as a teacher of industrial arts woodworking. During this period of time which has spanned over nearly half a century, the researcher continually noted the problems of obtaining properly seasoned wood.

The review of research literature on the topic of accelerating wood seasoning revealed limited information. Therefore, the researcher concluded: (1) that formal research on the topic should be conducted; and (2) that the discovery of a process for accelerating wood seasoning would make significant contribution to the field of wood technology and be of value to teachers of industrial arts woodworking and wood turners.

RESEARCH PROCEDURES

Each participant in the experiment was supplied a four by six by six inch unseasoned ash bowl blank. A set of instructions (See Appendix B) which included turning instructions, faceplate mounting directions, a rough finished turning guide, and a data sheet. The blank was removed from a plastic bag, bandsawed round, attached to a faceplate, and mounted on a lathe. The blank was next rough turned to the specifications shown in Figure 2 of Appendix B. The rough turned bowl was then removed from the lathe and from the faceplate. The weight and the dimensions of the bowl were recorded; after which, the bowl was either suspended for air drying or placed in a microwave oven.

In the case of air drying, the bowl was weighed and measured, and its condition recorded every Monday, Wednesday, and Friday. In the case of the microwave drying, the recordings were noted at two minute intervals. The drying process for both air and microwave drying was terminated after three consecutive recordings showing no weight loss.

The faceplate was again attached to the bowl. The bowl was then mounted on the lathe and was finished turned to the specifications contained in Figure 2 of Appendix B.

ANALYSIS OF DATA

The data sheets were collected from the participants. The starting weight, the ending weight, the percentage of weight loss, and the drying time were recorded. The responses were computed to determine the number of instances in which the accelerated seasoning process was

successful. The presentation and analysis of the data was presented in Chapter Four.

CHAPTER 4

PRESENTATION AND ANALYSIS OF THE DATA

Forty-five rectangular bowl blanks four by six by six inches were prepared from unseasoned white ash. Each blank was sealed in a plastic bag together with one fourth cup of water to maintain the unseasoned condition. The blanks and instruction sets (see Appendix B) were distributed to the eleven participating teachers who in turn assigned a blank and a set of instructions to each of his selected studnets.

The blank was removed from the plastic bag, bandsawed round, attached to a face plate, mounted on a lathe and rough turned to the shape in figure two, appendix B. The rough turned bowl was removed from the faceplate, weighed, measured, data recorded, and the drying process initiated. Data was recorded each Monday, Wednesday, and Friday for air dired bowls and each two minutes or less for microwave oven dried bowls.

The data was recorded on the data sheet contained in the instruction set (see Appendix B). The data sheets were collected and the data compiled. The rough turned bowls were evaluated and left with the students. From the analysis of the data compiled on the forty-five blanks distributed it was found that:

1. Sixty-nine percent (31) data sheets were returned. Data compiled from fourteen (seventeen data sheets were missing some data) is presented in Table A.

2. Forty percent (18) of the rough turned bowls seasoned to an acceptable quality.
3. Twenty-nine percent (13) were discarded because of checks, burning, and charring.
4. Sixteen percent (7) (at this writing) were finish turned.
5. The average weight loss was twenty-four percent.
6. The average calculated moisture content was twelve percent.
7. The average diametrical shrinkage across the grain was .250 inches while all other shrinkage was negligible.
8. Average drying time was forty-three days for air drying and 23 minutes for microwave oven drying.

TABLE A

Summary: Shrinkage and weight loss of rough turned blanks.

Blank	Starting weight (Grams)	End weight (Grams)	Shrinkage across grain inches	Weight Loss (grams)	Percent weight Loss	Drying Time	Acceptable Bowl Blank
AIR DRY							
1	709	529	.375	180	26	43 Days	Yes
2	680	507	.313	173	26	43	Yes
3	746	582	.313	164	22	43	Yes
4	755	568	.375	187	25	43	No Cracks
MICROWAVE OVEN							
5	888	639	.250	249	28	43 minutes	No Burned
6	878	672	.250	251	24	30	No Burned
7	622	566	.250	56	10	18	Yes
8	622	537	.313	85	14	18	Yes
9	594	481	.375	113	20	16	Yes
10	707	622	.250	85	13	16	Yes
11	877	594	.250	283	33	22	Yes
12	1075	735	.125	340	32	24 hrs	No split
13	594	424	.250	170	29	23 minutes	No Burned
14	566	368	.500	198	35	18	No Burned

TABLE B

Summary: Averaged Results of the Data Sheets

	Number	Percent
Number of Blanks Distributed	45	100
Number of Blanks Returned	31	69
Number of Blanks Satisfactorily Seasened	18	40
Number of Blanks Lost to checks and splitting	13	29
Number of Blanks Finish Turned	7	16
Average Weight Loss		24%
Average Moisture Content		12%
Average Shrinkage Across the Grain		.250 inches
Average Shrinkage with the Grain		Negligible
Average Shrinkage in Height		Negligible
Average Air Drying Time		43 days
Average Microwave oven drying time		23 minutes

CHAPTER 5

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Working with the lathe in bowl turning has been an integral part of woodworking. The supply of acceptably seasoned bowl blanks has diminished while the cost has substantially increased. There was a need for developing a method of accelerating the seasoning of available wood for use as bowl blanks.

SUMMARY OF THE STUDY

The purpose of the study was to establish through experimental research an improved method of accelerating the seasoning of bowl blanks. Specifically, the study determined: (1) whether a worthwhile method or methods were available for accelerating the seasoning of wood bowl blanks; (2) whether the blanks were of suitable quality; (3) whether the method or methods presented a worthwhile learning experience; and (4) whether the unseasoned wood and the equipment used in seasoning were available, safe, and within reasonable financial means.

This research examined and reported on attempts to experimentally accelerate the seasoning of wood. The experiment involved the collection and analysis of data supplied by participating industrial arts teachers from the Norfolk and Virginia Beach public school systems. Eleven teachers and thirty-one students were involved. The data supplied by

the study participants was compiled, studied, analyzed, and evaluated in terms of the stated null hypothesis.

The study was limited to: (1) Tidewater, Virginia; (2) data received from eleven teachers from the Norfolk and Virginia Beach public school systems; (3) an ERIC search, including RIE and CIJIE, and a search of the Department of Agriculture's data base(CAIN) on the topics of acceleration of wood seasoning; and (4) books, periodicals, and research specifically concerned with accelerating wood seasoning. One further limitation was the inconsistency in levels of cooperation and resulting accuracy of teachers assisting with the study.

The data sheets were collected from the participants. The starting weight, the percentage of weight loss and the drying time were recorded. The responses were computed to determine the numbers of instances in which the accelerated seasoning process was successful.

SUMMARY OF THE FINDINGS

The data was collected and analyzed. From the data collected the following findings were reported:

1. Of the 45 unseasoned blanks and instruction sets distributed there were 31 (69%) data sheets and seasoned blanks returned.
2. Forty Percent (18) produced satisfactorily seasoned blanks.
3. Twenty-nine percent (13) of the blanks were considered failures due to splitting during air drying, to burning, and charring during microwave oven drying, and one blank splitting while drying in a conventional oven.
4. Sixteen percent (7) at time of this writing were finish turned with acceptable results.

5. Average diametrical shrinkage across grain was .250 inches.
6. Diametrical shrinkage with the grain was negligible.
7. Shrinkage in height was negligible.
8. Calculated average moisture content was twelve percent including one bowl with twenty one percent and one bowl oven dry.

CONCLUSIONS

The following conclusions were drawn from a review of related research and literature and an analyses of the data collected:

1. There was limited research and literature available to the researcher on the topic of accelerating the seasoning of wood.
2. Interviews with experienced wood turners and sculptors indicates many have experimented with unseasoned wood and have:
   A. Abandoned the experiments as too time consuming;
   B. Produced limited results;
   C. Met with some success yet lacked sufficient data to publish;
   D. Were successful and have capitalized on their findings without publishing.
3. The process of rough turning, drying, and finish turning will produce worthwhile results for the average wood craftsman.
4. Lack of skill and experience on the part of the student in the use of the lathe and the microwave oven resulted in the loss

of some bowls.

5. The experiment was successful and the null hypothesis is reflected and the alternate hypothesis accepted.

RECOMMENDATIONS FOR FURTHER STUDY

1. Follow-up study with the same intended purpose should be conducted at some later date on available wood species to increase the data in this paper.
2. The researcher should utilize advanced students experienced in wood turning.
3. To provide comprehensive and extensive data on available woods, a study by college level students be conducted and the results published.

BIBLIOGRAPHY

Panshin, A.J. and Carl de Zeeuw. Textbook of Wood Technology. New York: McGraw-Hill Publishing Company.

Rebhorn, Eldow. Woodturning; Bloomington: McKnight and McKnight Publishing Company.

Murphey, Wayne K. and Richard N. Jorgensen. Wood as an Industrial Arts Material. New York: Porgamon Press, Inc.

Varossieau, W.W. Forest Products Research and Industries in the United States.

Peters, Geoff; Wood Turning; Arc Books.

Pain, F.; The Practical Wood Turner, London: Drake Publishers, Ltd.

UNPUBLISHED SOURCES AND MISCELLANEOUS DOCUMENTS

Tohline, Max B.; Weston, Conneticut

Lammers, Charles M.; Norfolk, Virginia

Nohr, Harry; Mineral Point, Wisconsin

APPENDIX A

RESEARCH PROPOSAL

INVESTIGATING METHODS OF ACCELERATING THE SEASONING OF WOOD BLANKS FOR BOWL TURNING

A Proposal

Presented to

Dr. E. Murray Rudisill, Jr.

In Partial Fulfillment

of the Requirements for the Course

ECIMI 536

---

by

Myron W. Curtis

July 1975

TABLE OF CONTENTS

STATEMENT OF THE PROBLEM

Wood is a Hygroscopic material. Because of this it loses (or gains) liquid water from the air.[1] The process of losing liquid water from lumber is called seasoning and is accomplished usually by air drying or kiln drying. Air drying is time consuming while kiln drying is expensive, usually unavailable and not recommended for lumber thicknesses greater than two inches.

As wood seasons, it shrinks and does so in an anisotropic manner,[2] i.e. the shrinkage is unequal along the longitudinal, tangential, and radial axes, these axes being at right angles to each other. As the wood seasons and shrinks it usually splits due to greater shrinkage tangentially than radially. These splits and the seasoning time involved are the major problems inherent in producing solid bowl blanks.

The problem is to find some means of methods of eliminating, or reducing to an acceptable level, the splits involved in seasoning and reducing the time required to a minimum, while holding cost to a minimum.

Chapter II

REVIEW OF THE LITERATURE

Reading research has produced little material pertaining directly to accelerated seasoning of wood in thicknesses of more than two inches. Much is written on kiln drying, air drying, and electronic drying of stock two inches thick or less and also on the technology of wood.[3] The bowl blank may be thought of as being a cube three inches thick, six inches wide, and six inches long, 3" x 6" x 6", or larger, from which a disc is cut. The problem is unique with bowl turning and of interest to a relatively few people. A search has been iniated through ERIC, CARD, Forest Products Laboratory, and Dr. Olan C. Oatman of Southwest Missouri State University in hopes of obtaining material relating to the subject. The results of similar work by Mr. Charles M. Lammers will be included in this paper.

Chapter III

PROCEDURE

An on-going investigation during the past eight years by this author as a high school woodshop teacher and a wood turning hobbyist has covered seven methods with mostly poor results. However, two of these seven methods show promise of producing well seasoned bowl blanks in a minimum of time, with few defects and a very low cost which is well within the reach of any student. This investigation will concern itself with these two methods:

1. Double Turn-Air Dry
2. Double Turn-Microwave Oven Dry

Both methods utilize a reduction in mass and thickness to accelerate the seasoning. This reduction in mass is accomplished by turning the blank while green or unseasoned to a rough shape and thickness. Using method number one the rough turned bowl will then be stored for air drying. Using method number two the rough turned bowl will be placed in a microwave oven where the moisture will be removed by baking.

With either method the rough shape is determined by the desired design. The rough wall thickness will be determined by an "educated guess" during this investigation and, from the data compiled, provide a table of rough wall thickness related to bowl diameter for future turnings.

In order to accomplish this study, "kits" will be made up containing:

1. Three unseasoned ash bowl blanks, 3" x 6" x 6".
2. Forms for recording weights, dates, bowl measurements, and observations.
3. Instructions for conducting the investigation.

The kits will be distributed to participating teachers along with verbal instructions. One high school will be selected, by personal interview, from each of the Tidewater area school districts which will comprise the population being sampled. Periodic telephone contact will be maintained with each teacher, completed kits will be picked up, evaluated, and the data compiled. Any finished bowls will then be returned to become the personal property of the turner.

It is anticipated that:

1. The investigation will meet with a good measure of success.
2. Method information will be disseminated by "word of mouth" area wide and will prove to be valuable.
3. The findings will be published in a periodical such as School Shop for much wider dissemination.

SEASONING DATA SHEET

FROM: Myron W. Curtis, Old Dominion University Industrial Arts Department, 853-3708 (home).

School _____ Instructor _____

Wood Turner _____

Date Turning Started _____ Date Turning Completed _____

Specie _____ Disc Dimensions _____

Beginning weight _____ Date _____

Rough Turned Weight _____ Date _____

ROUGH TURNED DIMENSIONS, WEIGHT, AND DATES

DATE	DIAMETER WITH GRAIN	DIAMETER ACROSS GRAIN	OVERALL HEIGHT	WEIGHT	SPLITS NUMBER	(For Microwave oven only) BAKING TIME(Minutes)

INSTRUCTION SHEET

FROM: Myron W. Curtis, Old Dominion University Industrial Arts Department
853-3708 (home)

The bowl blanks in this kit are unseasoned. They should be rough turned as soon as possible. They should be band sawn into discs, attached to a faceplate, and rough turned to a hemispherical shape with a wall thickness of approximately three fourths of an inch (3/4"). Remove the rough bowl from the face plate, weigh, measure, and record on the data sheet. Rough bowl should be placed on shelf to dry. The rough bowl should be weighed, measured, and data recorded weekly until the weight loss stops. Place rough bowl on face plate and complete the turning of the bowl.

If a microwave oven is available, the seasoning process can be completed in a matter of minutes. Place the rough bowl in the microwave oven, set timer for two (2) minutes. When the oven cuts off, remove the bowl and check temperature by touching. Continue by two minute periods until hot to the touch, weigh, measure, and record data. After the bowl has cooled, repeat the procedure until the weight loss has stopped. Place the rough bowl on the lathe and complete the turning.

BIBLIOGRAPHY

CITED REFERENCES

[1] Panshin, A. J. and deZeeua, Carl, Textbook of Wood Technology, Third edition, 1970, McGraw-Hill.

[2] Ibid, pg. 318

[3] Ibid, pg. 318

ACKNOWLEDGEMENTS

Mr. Charles M. Lammers, Departmental Chairman, Bayside High School, Virginia Beach, Virginia

APPENDIX B

INSTRUCTION SHEET

INSTRUCTION SHEET
ACCELERATED SEASONING OF BOWL BLANKS

MYRON W. CURTIS, GRADUATE STUDENT
O.D.U., I.A. Department
427-5300

To obtain standardized results it is necessary that these instructions be followed in detail and your cooperation is requested.

1. Bowl Blanks should remain in plastic bags until ready to turn or splitting will result.

2. The bowl needs to be rough turned in one bell, i.e.: removed from plastic bag, bandsawed round, mounted on face plate, and rough turned to the prescribed shape, measured, weighed and hung up to dry during one class meeting. Return to plastic bag if any of Step 2 is not completed.

3. A microwave oven may be used to accomplish the seasoning of the rough turned bowl and will reduce the time from weeks to minutes. Care must be taken to prevent charring and burning. "Baking" periods of two minutes each are recommended. Repeat baking periods till bowl is too hot to hold in your hands, allow time to cool, and repeat baking periods, weighing, measuring, and recording after each period. When bowl stops losing weight, it can be finish turned.

4. All blanks, or bowls, need to be returned to the author for evaluation. After evaluation, the bowls will be returned is so requested.

5. There is a $10.00 purchase award for the bowl which, in the opinion of the author, is the best turned bowl in the research project.

6. Time is of the essence during the rough turning stage. Ash dries rapidly and splits can occur during one days open air exposure. These blanks are as unseasoned as possible to prevent seasoning splits, and to produce more dramatic results in weight loss, shrinkage, and distortion. The instructor is urged to prepare in advance the instructions and equipment including a sensitive scale and if he desires, rough turn the first bowl.
   Steps to be followed:
   A. Remove blank from plastic bag.
   B. Wipe off excess moisture.
   C. With compass, draw 6" circle and bandsaw round
   D. Mount faceplate on blank using #10 or larger screws penetrating the blank no more than ½". Mounting is preferred on the "Convex" grain side SEE FIG 2.
   E. Mount faceplate/blank on lathe.
   F. Turn outside of blank true.
   G. Turn inside of blank to a "U" shape (dotted line, fig. 1). Side walls need to be 5/8" to 3/4" thick.
   H. Turn outside of blank to conform with inside shape(fig 1) leaving
   I. stock for a foot statement.
   I. Face off rim flat to facilitate shrinkage measurement.

J. Remove from lathe, remove face plate and weigh the rough bowl, measure height of bowl, and rim both with the grain and across the grain. Record date, weight and measurements.

K. Install one faceplate screw and hang up bowl to dry (out of sun and drafts).
L. Weigh and measure rough bowl periodically and record.
M. When rough bowl ceases to lose weight for a two week period, the bowl should be smooth turned and a finish applied (deft preferred).
N. Weight, measure, and record final values.

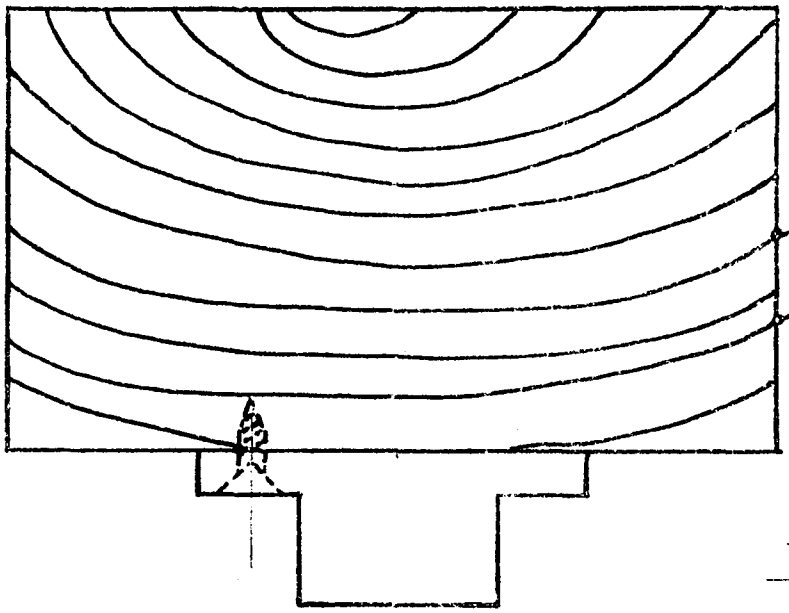
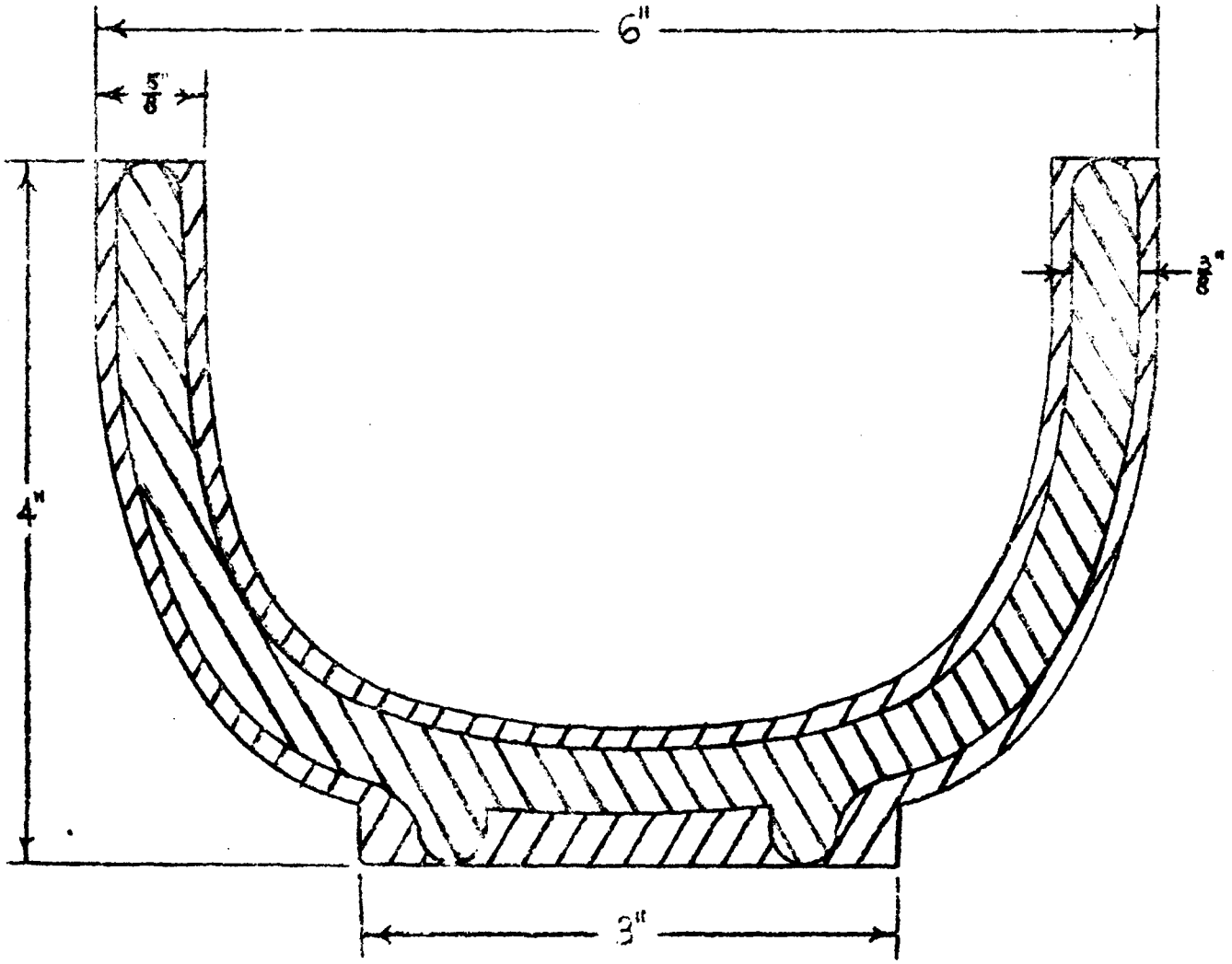


FIG #1



MYRON W CURTIS
GRADUATE STUDENT
ODU I.A. DEPT
427-5800

Fig #2

RESEARCH DATA SHEET ACCELERATED SEASONING OF BOWLS MYRON W. CURTIS GRADUATE STUDENT ODU IA DEPT 427-5300

DATE	MICRO WAVE OVEN MINUTES	WEIGHT	HEIGHT	RIM DIAMETER (WITH GRAIN)	RIM DIAMETER (ACROSS GRAIN)	[RECORD DEFECTS] AND NOTES

TURNER'S NAME ____________ SCHOOL ____________ INSTRUCTOR ____________

APPENDIX C

VITA

VITA

MYRON WILSON CURTIS

Myron W. Curtis presently serves as the Drafting Instructor at the Virginia Beach Vocational Technical Educational Center in the Virginia Beach City Public Schools System, and as a part-time instructor for Old Dominion University. Prior positions include woodwork instructor for Kempsville High School, furniture building at the Center for Effective Learning, Virginia Beach School System, and Wood Turning Instructor for the Chrysler Museum School in Norfolk, Virginia.

Curtis grew up in Knoxville, Tennessee, graduated from Knoxville High School in 1939, and he served 21 years in the United States Navy. He graduated from Old Dominion College in 1968 receiving a Bachelor of Science degree in Secondary Education. In the Spring of 1975, he was admitted to the School of Education, Old Dominion University, to begin advanced study leading to the Master of Science degree in Secondary Education. He has co-authored twelve educational and technical articles.