

Naval Education and
Training Command

NAVEDTRA 12204-A
September 1993
0502-LP-477-5600

Training Manual
(TRAMAN)



Machinery Repairman

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

Nonfederal government personnel wanting a copy of this document
must use the purchasing instructions on the inside cover.

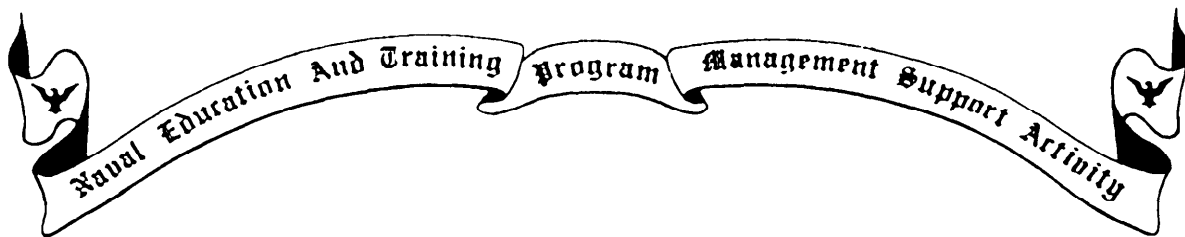


0502LP4775600

Although the words “he,” “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this text.

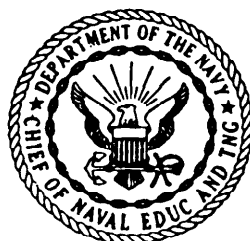
DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

Nonfederal government personnel wanting a copy of this document must write to Superintendent of Documents, Government Printing Office, Washington, DC 20402 OR Commanding Officer, Naval Publications and Forms Directorate, Navy Aviation Supply Office, 5801 Tabor Avenue, Philadelphia, PA 19120-5099, Attention: Cash Sales, for price and availability.



MACHINERY REPAIRMAN

NAVEDTRA 12204-A



*1993 Edition Prepared by
MRCS Wayne T. Drew*



COMMANDING OFFICER
NETPDTTC
6490 SAUFLEY FIELD RD
PENSACOLA, FL 32509-5237

ERRATA #1

18 April 2000

Specific Instructions and Errata for the
TRAMAN

MACHINERY REPAIRMAN, NAVEDTRA 12204-A

1. No attempt has been made to issue corrections for errors in typing, punctuation, etc.

2. Make the following changes to the Machinery Repairman text:

<u>Page</u>	<u>Column</u>	<u>Paragraph</u>	<u>Change</u>
2-2	1	3rd complete paragraph	Change paragraph to read as follows: "If a dimension is given as 3.000 inches, the... is ± 0.005 inch; or if the dimension... is ± 0.010 inch." vice "If a dimension is given as 3.000 inches., the... is ± 0.0005 inch; or if the dimension... is ± 0.005 inch."
5-6	1	1	Change line six to read "blotter may be no more than 0.025 inch thick and a" vice "blotter may be no more than 0.0025 inch thick and a."
7-12	1	last line	Change formula to read as follows: $\frac{40}{N} = \frac{40}{8} = 5 \text{ turns}$
11-8	2	Figure 11-10	Change top "X AXIS" in figure to read "Z AXIS."
12-3	2	Figure 12-4	Change figure caption to read as follows: "Powder feed unit." vice "Power feed unit."
13-4	2	Number 6	Change number 6. to read as follows: "6. Face, center drill, and drill the end of the shaft. The diameter of the hole should be about 1/4 of the diameter of the shaft; the depth of the hole should be at 5/8 inch per inch of shaft diameter minus 1/8 inch."
13-4	2	Number 8	Change number 8, line 2 to read as follows: "The stub should be 1/8 inch larger in diameter and 3/8."

3. Wherever you see "Blueprint Reading and Sketching, NAVEDTRA 10077-F1," in the text, change it to read "Blueprint Reading and Sketching, NAVEDTRA 12014."

4. Wherever you see "Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, OPNAV 51.000.19B," in the text, change it to read "Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, OPNAV 51.000.19."

PREFACE

This Training Manual (TRAMAN) and Nonresident Training Course (NRTC) form a self-study package to teach the theoretical knowledge and mental skills needed by a Machinery Repairman. This package may be combined with on-the-job training to provide the necessary elements of practical experience and observation of techniques demonstrated by more senior Machinery Repairmen.

Completion of the NRTC is the usual way to satisfy the requirement to complete the TRAMAN. Learning objectives are included at the beginning of each chapter of the TRAMAN. Assignments in the NRTC have supporting questions to help the student learn the materials in the TRAMAN.

SCOPE OF REVISION

This training manual contains the following major revisions: Chapter 5 has new material on grinding hand tools and sharpening twist drills, and on the selection and use of carbide tooling. Chapter 11 has new material on computer numerical control machines. Chapter 15 has new material on heat treating. Information on obsolete equipment such as the horizontal turret lathe has been deleted.

1993 Edition

**Stock Ordering No.
0502-LP-477-5600**

Published by
NAVAL EDUCATION AND TRAINING PROGRAM
MANAGEMENT SUPPORT ACTIVITY

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON, D.C.: 1993

THE UNITED STATES NAVY

GUARDIAN OF OUR COUNTRY

The United States Navy is responsible for maintaining control of the sea and is a ready force on watch at home and overseas, capable of strong action to preserve the peace or of instant offensive action to win in war.

It is upon the maintenance of this control that our country's glorious future depends; the United States Navy exists to make it so.

WE SERVE WITH HONOR

Tradition, valor, and victory are the Navy's heritage from the past. To these may be added dedication, discipline, and vigilance as the watchwords of the present and the future.

At home or on distant stations as we serve with pride, confident in the respect of our country, our shipmates, and our families.

Our responsibilities sober us; our adversities strengthen us.

Service to God and Country is our special privilege. We serve with honor.

THE FUTURE OF THE NAVY

The Navy will always employ new weapons, new techniques, and greater power to protect and defend the United States on the sea, under the sea, and in the air.

Now and in the future, control of the sea gives the United States her greatest advantage for the maintenance of peace and for victory in war.

Mobility, surprise, dispersal, and offensive power are the keynotes of the new Navy. The roots of the Navy lie in a strong belief in the future, in continued dedication to our tasks, and in reflection on our heritage from the past.

Never have our opportunities and our responsibilities been greater.

CONTENTS

CHAPTER	PAGE
1. Toolrooms and Tools	1-1
2. Layout and Benchwork	2-1
3. Metals and plastics	3-1
4. Power Saws and Drilling Machines	4-1
5. Offhand Grinding of Tools and Selection of Carbide Tools	5-1
6. Engine Lathes	6-1
7. Milling Machines and Milling Operations	7-1
8. Vertical Turret Lathe and Horizontal Boring Mill	8-1
9. Shapers, Planers, and Engravers	9-1
10. Precision Grinding Machines	10-1
11. Computer Numerical Control Machines	11-1
12. Metal Buildup	12-1
13. Repair Work.	13-1
14. Gears and Gear Cutting	14-1
15. Metallurgy and Heat Treating	15-1
APPENDIX	
I. Glossary	AI-1
II. Tabular Information of Benefit to a Machinery Repairman	AII-1
III. Formulas for Spur Gearing	AIII-1
IV Derivation Formulas for Diametral Pitch System	AIV-1
V. References Used To Develop The TRAMAN	AV-1
INDEX	INDEX-1