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Bulletin No. 42 August 15, 1944

The FPHA Fuel and Utility Conservation Program

INTRODUCTION

The present tight situation concerning fuels of all kinds and the anticipated shortage for the next heating season, has necessitated the development of a nation wide conservation program. The U. S. Bureau of Mines, through its National Fuel Efficiency Program, is the principal coordinating agency in the conservation effort. In cooperation with this program the FPHA presents this bulletin, which will be supplemented with additional sections, and releases on methods in Bulletin No. 63, Operation and Maintenance Handbook, and other pertinent materials. This bulletin will deal with the general, over-all aspects of conservation for use in the regional offices.

The FPHA program, developed as a part of the national program, will consist of the following:

Training of project employees in the firing and maintenance of fuel using equipment, in the conservation of utilities and in aiding in training tenants in these matters.

Tenant education in the firing and care of heating and cooking equipment and in methods of household care and operation which contribute to the efficient use of fuel and utilities.

Advice and personal service on the use of fuel and utilities to housing managers, maintenance superintendents and heating plant engineers provided by the Central and regional offices, other governmental agencies and private concerns.

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I. RESPONSIBILITIES

A. Central Office Functions and Responsibilities

1. Coordinate the FPHA program with the national program.

2. Furnish regional offices with information, advice and procedure on the program.

3. Provide basic training courses and training aids.

4. Make preliminary arrangements with and coordinate the services of the U. S. Office of Education and state boards of vocational education in the Vocational Training Program; the U. S. Bureau of Mines, National Fuel Efficiency Program; the Anthracite Industries Incorporated; the Solid Fuels Administrator for War; and other governmental and private agencies whose services may be available to the FPHA program.

B. Regional Office Functions and Responsibilities

1. Organize and lead the program in the region. In order to accomplish a degree of uniformity in the development of the program and to simplify coordination and preparation of materials, the following organization of the program is suggested:

   a. Appoint the maintenance supervisor as the individual directly responsible to the assistant director for project management for the operation of the regional program, and its coordination with the rest of project operation and maintenance.

   b. Appoint a conservation committee consisting of the maintenance supervisor, management training adviser, project services adviser, and an area supervisor, in which the assistant director for project management should be a member ex officio.

2. Develop and carry out the Employee Training Program, Section II.. Details given on page 3.

3. Develop and carry out the Tenant Education Program, Section III. Details given on page 5.

4. Provide consultation service and advice through the agencies mentioned under Central Office Functions, paragraph 4.

5. Inform local housing authorities and FPHA housing managers of the consultation service and advice available and how they may be obtained and used.

6. Follow up and aid the projects in evaluating results obtained from the program.

a. On all regular inspections of projects follow up on the operation of the program.

b. Develop methods for the management of projects to properly record results and to determine the advantages obtained from the program. This should include records of fuel and utility consumption, maintenance costs, tenant reports on operation experience, etc.

c. Review results obtained with a view of continuing the program and applying a similar procedure to other phases of project operation.

7. Inform Central Office of other sources of assistance or information that appear to be of value to the program.

II. PROJECT EMPLOYEE TRAINING

A. Instructor. All those designated as employee trainers except instructors from the state boards and other agencies should be given an instructor's training course by the regional training advisor or the short intensive course by instructors from the state board of vocational education.

B. Project Employee Training.

1. Training courses to be available through the Central Office but given by regional personnel will include:

a. The efficient operation (firing) and maintenance of

(1) Forced warm air heating systems
(2) Forced hot water heating systems
(3) Steam heating systems
(4) Space heaters and ranges

b. Conservation of project utilities.

c. Assisting in tenant education.

(1) Firing and care of heating and cooking equipment.
(2) Methods of household care and operation which contribute to efficient use of fuel and utilities.

2. Those to be trained

a. The maintenance superintendent should be trained in all courses affecting his project. It shall be his responsibility to train project employees and to continue training as made necessary by changed conditions, or changes in personnel.

b. Firemen and operators of project fired heating plants.

c. Project maintenance personnel responsible for the operation and care of other equipment.

NOTE: Training of this personnel will be the responsibility of the maintenance superintendents at their respective projects.

3. Training should be done by:

a. Members of the regional staff, particularly mechanical engineers engaged in maintenance, construction and other technical work. It is advisable to have as many trainers as possible chosen from within the housing organization because field contacts will be beneficial and because the follow-up work should be done by housing staffs.

b. Members of local authority staffs engaged in supervision of project operation and maintenance. Local authorities should be invited to enroll available personnel as teachers as a means of benefiting their own organization and for continued training of their employees.

c. Instructors from the State Boards of Vocational Education. The training courses to be available from the Central Office are being developed in collaboration with the U. S. Office of Education. The state boards of vocational education have been informed that the training of housing employees is a part of the war training program, and are ready to assist when requested by the regional office or local housing authorities. There is no charge for this service.

d. Instructors from other agencies, either on general subjects as noted above or on special subjects. Such agencies are the Anthracite Industries, Inc., and the Fuel Conservation Council for War of the Automatic Control Industries.

NOTE: Courses of instruction to be given by these or other agencies should be carefully reviewed to see that there is no conflict with other instruction given, and that they conform to FPHA Central Office and regional standards.

4. Where and how training should be scheduled:

a. Training courses for firemen and operators of project fired heating plants should be given at the project where they work, and as a regular part of the job. This training can best be done by instructors from the state boards of vocational education.

b. Training courses for maintenance superintendents should be given in groups at projects where the appropriate type of equipment is available for demonstration. Attendance should be scheduled on the basis of type of equipment and fuel used.

III. TENANT EDUCATION

A. Local Management Aid. The primary responsibility for tenant education rest with local management. They shall see to it that:

1. Tenant conservation committees are formed.

2. Printed materials for distribution are received by the tenants.

3. Posters are properly installed.

4. Necessary tenant meetings are called.

5. Full use is made of the experience of the maintenance employees especially in regard to the training given under the employee training program.

6. Regional instructions are carried out.

B. Regional Office Aid. The regional office will assist the local management by:

1. Offering advice and assistance in planning and operating their program.

2. Encouraging the formation of tenant conservation committees on all projects.

3. Assisting in getting the cooperation of other agencies.

4. Providing material for the education of and for distribution to the tenants.

C. Central Office Aid. The Central Office will furnish aids to the regions in the form of materials to be used for training and distribution to tenants.

IV. SOURCES OF ASSISTANCE

A. State directors of voactional training for War Production Workers (list attached as Attachment A).

Assistance available:

1. Assistance in developing instructional program.

2. Instructors for use in the program.

NOTE: The training of FPHA project employees under the state vocational education program has been approved by the U. S. Office of Education. There is no charge for this service.

B. U. S. Bureau of Mines, National Fuel Efficiency Program.

Mr. Cheasely, Chief Engineer. This program is directed to installations of 4 apartment size and larger.

Volunteer engineers have been recruited in all sections of the country for consultation and guidance in plant operation. (List of coordinators is attached as Attachment B)

Assistance available:

1. Consultations and advice on operation of plants in 4 apartment buildings or larger.

2. Literature.

3. Training courses (quiz sheets).

4. Speakers for tenant group training.

The names of assistant directors for management have been placed on the mailing list of the program.

C. Anthracite Industries, Inc., 101 Park Avenue, New York City, Attention of Mr. R. Grover, Vice President.

Assistance available:

1. Training of project personnel in use of anthracite fuels and their substitutes, by their field force. Particular attention to tenant operated equipment.

2. Speakers for tenant group training.

D. Solid Fuels Administrator for War.

Emphasis in conservation on bituminous fuels. Program not yet announced.

E. The Fuel Conservation Council for War of the Automatic Control Industries, C. W. Nessell, Secretary, 101 Vermont Avenue, N.W., Washington, D. C.

Assistance available:

1. Courses of instruction in adjustment and maintenance of automatic controls.

2. Literature on the above and allied subjects.

F. The War Production Board, Conservation Division, Washington, D. C.

Assistance available:

Literature on fuel conservation.

G. Local Utility Company, Gas Water and Electricity.

Assistance available:

1. Speakers and educational matter for tenant group training.
2. Literature
3. Assistance on local problems.

Federal Security Agency
U. S. OFFICE OF EDUCATION
Vocational Training for War Production Workers
Washington 25, D. C.

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(Rev. 7/14/44)

STATE DIRECTORS OF VOCATIONAL TRAINING FOR WAR PRODUCTION WORKERS

The title State Director of Vocational Training for War Production Workers should be used unless a different title is indicated below.

Alabama	Dr. J. B. Hobdy, State Department of Education, Montgomery 4.
Arizona	L. D. Klemmedson, Capitol Annex Building, Phoenix.
Arkansas	Fred A. Smith, Room 120, State Capitol, Little Rock.
California	Samuel L. Fick, State Department of Education, Sacramento, 14.
Colorado	H. A. Tiemann, 210 State Office Building, Denver 2.
Connecticut	A. S. Boynton, State Department of Education, Hartford 13.
Delaware	R. W. Heim, Administration Building, 11th and Washington Streets, Wilmington 9.
Dist. of Columbia	Lawson J. Cantrell, District Director of Vocational Training for War Production Workers, Franklin Administration Building, 13th and K Streets, N.W., Washington 5.
Florida	R. D. Dolley, State Department of Education, Tallahassee.
Georgia	M. D. Mobley, State Department of Education, Atlanta 3.
Hawaii	_____, Territorial Director of Vocational Training for War Production Workers, P.O. Box 1601, Honolulu.
Idaho	William Kerr, 1301 Capitol Boulevard, Boise.
Illinois	Ernest J. Simon, 216 East Monroe Street, Springfield.
Indiana	H. G. McComb, 701 Illinois Building, Indianapolis 4.
Iowa	_____, State Department of Education, Des Moines 19.
Kansas	C. M. Miller, State Department of Education, Topeka.
Kentucky	Dr. Ralph H. Woods, State Department of Education, Frankfort.
Louisiana	Dr. Andrew Triche, State Department of Education, Baton Rouge.
Maine	Austin Alden, 341 Water Street, Augusta.
Maryland	John J. Seidel, 1111 Lexington Building, Baltimore 1.
Massachusetts	Dr. R. O. Small, 200 Newbury Street, Boston 16.
Michigan	George H. Fern, State Board of Control for Vocational Education, Lansing 4.
Minnesota	Harry C. Schmid, 2651 University Avenue, St. Paul 1.
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Montana	Ralph Kenck, Montana State College, Bozeman.
Nebraska	G. F. Liebendorfer, State Capitol Building, Lincoln.
Nevada	_____, State Department of Education, Carson City
New Hampshire	Walter M. May, State Department of Education, Concord.

New Jersey.....	J. A. McCarthy, Trenton Trust Building, Trenton.
New Mexico.....	Frank E. Wimberly, State Department of Education, Santa Fe.
New York.....	Oakley Furney, State Education Department, Albany 1.
North Carolina....	J. Warren Smith, State Department of Public Instruction, Raleigh.
North Dakota.....	Edward Erickson, University Station, Grand Forks.
Ohio.....	Joseph R. Strobel, 150 East Broad Street, Columbus 15.
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Oregon.....	O. I. Paulson, State Department of Education, Salem.
Pennsylvania.....	Dr. Paul L. Cressman, State Department of Public Instruction Harrisburg.
Puerto Rico.....	Hermand Monserrate, Insular Director of Vocational Training for War Production Workers, Insular Board for Vocational Education, P. O. Box 4552, San Juan 23.
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South Carolina....	B. R. Turner, State Department of Education, Columbia 10.
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Texas.....	James R. D. Eddy, State Department of Education, Austin 11.
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Vermont.....	John E. Nelson, State Department of Education, Montpelier.
Virginia.....	Dr. B. H. Van Oot, State Department of Education, Richmond 1.
Washington.....	H. G. Halstead, State Board for Vocational Education, Box 97 Olympia (For correspondence only. Do not show box number when sending telegrams.)
West Virginia.....	William B. Connoley, 1720 Quarrier Street, Charleston 1.
Wisconsin.....	R. L. Welch, Acting, State Office Building, Madison 2.
Wyoming.....	Sam Hitchcock, State Department of Education, Cheyenne.

July 14, 1944
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PART II. A Course of Training for FPHA Employees in the Operation and Maintenance of Heating Equipment

Section I. INTRODUCTION

This course of instruction has been prepared for the training of project employees in the operation and maintenance of coal burning equipment, for the purpose of increasing fuel economy and improved maintenance. An important result anticipated is the added assistance which may be given by project maintenance personnel in the education of tenants in the efficient use of heating equipment.

The scope of the course is limited to simpler group and service building plants, and to individually fired tenant units. The course does not apply to high pressure group plants nor to central heating systems.

The entire field of heating is not presumed to be covered by the course, but rather those types of systems and fields of equipment in use on FPHA projects.

The course has been prepared in simplest terms, and so illustrated that it may be understood by those not familiar with heating equipment and practices. Proper supplement of the course material, by the instructor, is presumed.

The course was prepared in cooperation with the Instructional Materials Section, Vocational Training for War Production Workers, U. S. Office of Education, Federal Security Agency.

For purposes of distribution, the course has been divided in two parts. That part of the course to be used by instructors only, is contained in Part II of Bulletin No. 42. The content material of the course, which is to be used by both students and instructors; has been issued in Bulletin No. 63, Operation and Maintenance Handbook, Chapter 7.60, since it is to be retained by project employees upon completion of the course.

Section II. CONTENTS OF THE TRAINING COURSE

Bulletin No. 42, Part II

I. Introduction

II. Contents

III. Suggested Use of the Training Course

IV. Suggested Instructional Content

A. Furnace or Boiler Operation

B. Hot Water Heater

V. Review Questions

Bulletin No. 63, Chapter 7.60 (The following sections of the course are contained in the Operation and Maintenance Handbook, Bulletin No. 63)

I. Information Sheets

A. Heat and How Produced

1. Heat
2. Fuels
3. Equipment

B. Types of Heating Systems

1. Forced Warm Air
   a. Controls
2. Forced Hot Water
   a. Controls
3. Steam
   a. Controls
4. Space Heater
   a. Controls

II. Operation Sheets

III. Supplementary Operations

IV. Outline of Maintenance of Heating Equipment

V. Books and Pamphlets

Section III. SUGGESTED USE OF THE TRAINING COURSE

1. General Description of Course Operation. The course is designed for use in training firemen and maintenance personnel who are working on housing projects. A portion of the training is given to an assembled group through lecture and discussion of the principles and methods of efficient firing and heating equipment maintenance. Demonstrations of firing and maintenance methods should be given on operating equipment on an individual basis or to a group.

On experimental training programs that have been conducted, the instructor presented information on "What Firemen Needs to Know" in connection with his work. When necessary, charts and diagrams were developed on the blackboard with appropriate explanations. This was followed by group discussion of the applications of this information to the actual work jobs of the firemen. This part of the course was based on the topics listed in this bulletin in the right hand columns of pages 5-8, Section IV, "Suggested Instructional Content", Item A. Furnace or Boiler Operation, and Part B. Hot Water Heater.

The instructor working with each fireman individually, later demonstrated the work jobs that a fireman has to do as listed in the left hand column, "Suggested Instructional Content," Parts A and B, with particular emphasis on starting and maintaining the fire. The performance of each fireman was later checked on the job in the light of efficient operation. Each phase of firing was covered in this way. Where the fireman are responsible for maintenance of equipment the training can be covered in a similar manner using the outline given on page 9, Item C, Furnace and Boiler Maintenance.

In the classes that have been conducted, it was found that in most cases a program for a group of 8 to 10 firemen without equipment maintenance responsibilities could be completed in from three to five days. The group instruction in these instances consisted of three to five 2-hour sessions with all of the firemen attending these sessions. The rest of the instructor's time was devoted to firing demonstrations and checking the work of individual firemen during their working shifts.

The above is the basis on which a fireman training course was conducted during the heating season 1943-1944 in Region III by State Vocational Instructors and is offered as an aid to the instructor in conducting his course. The course as outlined in this bulletin is similar to the course given in Region III but has been designed to include additional items covering maintenance of heating equipment and training which maintenance personnel should have in order to instruct tenants in the proper care and operation of their equipment.

2. Suggested Instructional Content. (Section IV - Bulletin No. 42, Part II). The outline of instructional content may be used by the instructor as a guide in covering topics that will be included in the training. The items listed in

the left-hand column are fundamental operations in the performance of which the fireman should be trained. The topics in the right-hand column indicate the essential information that the fireman should have in performing the operations of his job.

The most important of the operations and informational topics are covered by the information sheets and operation sheets included in Sections I and II of Bulletin No. 63, Chapter 7.60. Reference to these sheets is made at various points in the outline where they may be appropriately used.

3. Information Sheets (Section I, Bulletin No. 63, Chapter 7.60). The "Information Sheets" included in this section are intended for use in the portion of the training course outlined in Bulletin No. 42, Part II, Section IV Suggested Instructional Content, Item A, "Furnace or Boiler Operation", Items 1 to 3, inclusive. The content of these sheets cover the knowledge of heat, fuels, equipment and types of heating systems, which is considered essential to an understanding of efficient furnace or boiler operation. The instructor will wish to select the information sheets covering the types of fuels, equipment and heating systems that the firemen use in their daily work. It is intended that such a selection will be made in order to avoid presentation of material that is not adapted to the work of the fireman on a given project.

The Information Sheets may be used by the instructor as a basis for the instruction of assembled groups. It is also desirable that the sheets be available for the information and use of the trainees.

4. Operation Sheets (Section II, Bulletin No. 63, Chapter 7.60). The "Operation Sheets" in this section cover the important actual work jobs of the fireman as outlined in Bulletin 42, Part II, Section IV, Suggested Instructional Content, Item A, "Furnace or Boiler Operation", items 1 to 3, inclusive, Item C, "Furnace and Boiler Maintenance", Item D, "Tenant Operated Equipment". Each sheet includes specific instructions on tools and equipment necessary t do the job, how the job is done, and auxiliary information including safety points. These sheets furnish a specific pattern of work and for this reason may be made of great value as teaching aids as well as a standard of work for the fireman.

The Operation Sheets may be used in planning demonstrations during the course and in checking work methods of the fireman. It is desirable that each trainee have access to these sheets both during the course and afterward.

5. Supplementary Operations (Section III, Bulletin No. 63, Chapter 7.60) This section of Bulletin No. 63 should be used in connection with training the firemen in their special duties having to do with furnace or boiler operations. Most of these operations relate to precautionary measures and emergency situations. Specific procedures are given to meet each condition. It is suggested that trainees be impressed with the importance of becoming familiar with all of these procedures. The minimum items to be covered in the course are listed in Bulletin No. 42, Part II, Section IV, Suggested Instructional Content, Part A, "Furnace or Boiler Operation", Item 4, Supplementary Operations.

6. Outline of Maintenance of Heating Equipment (Section VI, Bulletin 63, Chapter 7.60). This outline is a check list of annual maintenance work on furnaces and boilers. It provides no specific instructions on the manner in which the work is to be done. In the training of firemen it is useful as a reference of responsibilities and should be used only in courses conducted for firemen who have maintenance responsibilities. Specific instruction on how th work is to be done can not be included in this course due to limitations of time available for training. Such instructions will be obtainable by the fireman from the maintenance superintendent of the particular project.

7. Review Questions (Section V, Bulletin No. 42, Part II). This section covers questions which refer to subject matter in the Information Sheets, and may be used during the course by the instructor as he feels will be most effective or at the end of the course for review purposes.

8. Books and Pamphlets (Section V, Bulletin No. 63, Chapter 7.60). This is a selected list of reference material that will be of value to both instructor and trainee. The instructor should examine the list carefully and determine which publications will be of value for trainee use. It is suggested that the instructor may wish to order a sufficient supply for the use of trainees.

In addition to the material included in this list the trainees should be advised to obtain from the manufacturer of the heating equipment they use any special instructions on the operation of this equipment that may be available.

SECTION IV. SUGGESTED INSTRUCTIONAL CONTENT

(All references in parentheses in this section are to Bulletin No. 63, Chapter 7.60. Use the following key: O. S. - Operation Sheet
I. S. - Information Sheet
p. - Page)

What Fireman Does	What Fireman Needs to Know
A. Furnace or Boiler Operation	
1. Cleaning	1. Cleaning
a. Cleans Chimney *(O.S.p.17) (O.S.p.18)	a. Location, when and methods of cleaning Location of clean-out door Care of clean-out door
b. Cleans Smokepipe (O.S.p.19)	b. Location of smokepipe Location of clean-out plug When to clean How to tell when pipe needs cleaning

What Fireman Does	What Fireman Needs to Know
c. Cleans flues (O.S.p.20)	c. Location of flues (I.S.p.2) How often to clean Method of cleaning Function of flues Effect of various types of fuel on cleaning Type of brush to use
d. Cleans firebox (O.S.p.21)	d. Location of firebox (I.S.p.2) When to clean Purpose of firebox Know type of tool to use and when to use each Construction of firebox Purpose of liner Ashes not to accumulate behind liners
e. Cleans ashpit (O.S.p.22)	e. Location of ashpit (I.S.p.2) Purpose of ashpit How often to clean Type of tool to use
f. Inspects grate	f. Location of grates (I.S.p.2) Types of grates, single or double What to observe when inspecting
2. Starting the Fire	2. Starting the Fire
a. Sets damper (O.S.p.24)	a. Location of dampers Purpose of dampers Position of dampers for starting fire Position of dampers for controlling heat Types of dampers
b. Adjust choke damper (O.S.p.24)	b. Location of choke damper Purpose of choke damper Position for firing Position for operating and emergency
c. Kindles fire (O.S.p.24)	c. Method of building fire Layer of ashes on grates Purpose of kindling Where to secure kindling Where to store kindling Danger of fire if kindling is piled too close to furnace Size of kindling to use Quantity to use

What Fireman Does	What Fireman Needs to Know
d. Adds coal (fuel) (O.S.p.25)	d. At what stage to add coal Amount of coal to add
e. Checks controls	e. Location of various controls applying to particular system under discussion Forced Warm Air - Fan Control Damper Motor, etc. (I.S.pp.4-5-6) Forced Hot Water - Booster Pump, Aquastat, etc. (I.S.pp.7-8-9-10) Steam - Water Feeder, Thermostat, Damper Motor, etc. (I.S.pp.11-12-13) Names of controls and description of their functions Theory of heating (I.S.p.1)
f. Adds more coal (O.S.p.25)	f. Technique of shoveling in coal Amount of coal to add Height of fire to maintain Fire surface (shape, etc.)
3. Maintaining the Fire	3. Maintaining the Fire
a. Shakes grates (O.S.p.26)	a. Location of grates Types of grates, single, double Need for firing only one grate during mild weather, both during cold weather To shake grates gently To shake until live coals show When to shake grates To lock grates in position
b. Removes excess ashes form edges of fire (O.S.p.26)	b. Reasons for removing excess ashes from sides Type of tool to use Avoid pulling out liners or breaking grates
c. Breaks up fire before adding new coal (O.S.p.26)	c. Why break up fire rather than stir Shape fire

What Fireman Does	What Fireman Needs to Know
d. Adds coal to fire (O.S.p.26)	d. Effect of outside temperature on firing Types of fuel and methods of handling each (I.S.p.1) Fuel economy Characteristics of various types of fuel (I.S.p.1) Safety factors Location of fire extinguisher Types and use of fire extinguishers
e. Checks water in humidifier (Applies only to Forced Warm Air System).	e. Location of humidifier (I.S.p.5) Purpose of humidifier How often to check Care in filling humidifier Avoid coal and ashes in humidifier
f. Removes ashes from ashpit	f. How often to remove How to reduce dust when removing Danger of damage to grates
g. Places ashes in containers (O.S.p.26)	g. Type of tool to use Damage to containers from hot coals
h. Removes ashes to storage space	h. Where to store
i. Cleans floor (O.S.p.26)	i. General housekeeping rules

4. Supplementary Operations

Note: The items listed here are a part of the special duties of the fireman. These items of responsibility should be covered in accordance with procedures indicated in Section III, Bulletin 63, Chapter 7.60.

a. The building is on fire

b. The building overheats - no building fire

c. Blower fails to operate

What Fireman Does	What Fireman Needs to Know
d. Other items of responsibility as indicated in Section III, Bulletin 63, Chapter 7.60 should be covered in the course to the extent that time is available.	
B. Hot Water Heater (Bucket-a-day)	
1. Firing	1. Firing
a. Kindles fire (O.S.p.24)	a. Methods of building fire Function of heater
b. Adds coal (O.S.p.24)	b. Types of fuel to use Dangers of over-firing Location and use of fire extinguisher Know when tenants need most water
c. Removes ashes	c. When to remove ashes Care of grates
d. Checks controls	d. Location of controls (I.S.p.8) Minimum and maximum temperature limits Types of controls How to stop valves when they release Hot water in cold water lines To keep ashpit door closed To keep clean out door closed
e. Cleans up	e. Housekeeping duties
C. Furnace and Boiler Maintenance	
1. Repainting furnace, pipe, etc.	1. Done after heating season Type of paint to use
2. Inspecting tools and reporting and repairing damaged tools	2. Care of equipment Method of reporting
3. Requisitioning new equipment	3. Forms to use
4. Reporting breakage	4. Method of reporting
5. Replacing firebox liner (O.S.p.23)	5. Let furnace cool off before replacing Proper position of liner

What Fireman Does	What Fireman Needs to Know
6. Adjusting fan belt (O.S.p.27)	6. Location of fan belt Inspect to see if belt should be replaced Method of determining proper tension
7. Replacing grate bar (O.S.p.29)	7. Cool furnace required Proper positioning of bar
8. Replacing fusible link in fire damper (O.S.p.30)	8. Location of fire dampers Proper fusibility of link
9. Maintenance responsibilities at the close of the heating season (Refer to Section IV, Bulletin 63, Chapter 7.80)	

D. Tenant Operated Equipment

1. Operating a circulating coal space heater (O.S.pp.31-32)	1. Location of controls Relation of controls in regulating draft Combustions characteristics of fuel When to remove ashes Reducing dust nuisance
2. Operating a coal cooking range (O.S.p.33)	2. Same as in operating a heater Location of water back or coil Location and care of stove flues and dampers Effect of dirty flues on oven efficiency.

Section IX. REVIEW QUESTIONS

1. What is heat?
2. How do we recognize heat?
3. What instrument is used to measure heat?
4. How is heat usually produced?
5. In order to cause a substance to burn, what conditions are necessary?
6. What are the most common types of fuel?
7. What are the two general classes of coal?
8. What are the principal differences between anthracite and bituminous coal?
9. What is smoke?
10. What does black smoke indicate?
11. How can black smoke be eliminated?
12. When burning takes place what 3 things are usually produced?
13. What equipment is generally used to burn coal?
14. What are the parts of the furnace?
15. What is the purpose of the firebox?
16. Why is air admitted over the firebed?
17. What is the purpose of the flues or tubes?
18. What is the purpose of the ashpit?
19. What two things may happen if the ashpit is allowed to fill up with ashes?
20. What is the grate?
21. How often should the flues be cleaned and why?
22. How does the forced warm air system operate?
23. What are the controls generally used with the forced warm air system?
24. What is a relief duct?
25. What is a fire damper?
26. How does the forced hot water system operate?
27. What are the controls generally used with the forced hot water system?
28. What causes the water to circulate in the forced hot water system?
29. Why will the water not circulate when the pump is not operating?
30. How does the steam system operate?
31. What are the controls used with the steam system?
32. How does the water get back into the boiler?
33. What is a thermostatic trap and how does it operate?
34. How do we start a fire using bituminous coal?
35. How do we start a fire using anthracite coal?
36. Why are a few red coals always left exposed on the grate when we add coal to the fire?
37. Why do we always stand to one side when opening the fire door?
38. Where is the draft damper located and what does it do?
39. Where is the check damper located and what does it do?
40. Where is the choke damper located and what does it do?

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