

operation or what data shall be recorded. All these questions must be settled for each individual plant on their own merit. Suffice it to say that if the power plant, and particularly the boiler house, is not provided with all necessary instruments, there is no hope of operating it economically. Yet the fact that these instruments are installed does not mean that the economy is good, as it depends entirely on the correct interpretation of their indication and proper use of this knowledge.

The function of the planning department in this connection is that of a custodian of a most valuable source of information; without which economic power production is not possible. The first step, therefore, toward observing the results is collecting and analyzing all operating data. A fair idea what the most important of them are may be gathered from the log form, Fig. 17. Its specific features are (1) the record of men's performance and bonus earned, (2) maintenance record and (3) summary of result. Supplementing the regular log-data, there is a load curve. Incidentally, the data obtained from recording instruments are shown only as totals and averages per shift, with cross-references to the original charts. It is difficult to overemphasize the value of such complete logs, although nothing so elaborate as this will be of any use for a plant where planning is not done. The cause of failure to live up to the task, as a rule, can be easily traced from the log records, and only in rare cases are other means of information needed.

21. When the accomplishment of tasks is determined from these returns, the bonus slips are prepared, to be handed to the men at the time they report for duty on their next shift. If the bonus was not earned, the lost-bonus slip is given to the man, telling him briefly the reason; the work boss or instructor further attends to the matter by helping and instructing the man to avoid loss in the future. The reasons why the men were unable to live up to their tasks can generally be classified into four groups; accordingly these forms, Fig. 18, are printed on paper of different colors, indicating the location of responsibility:

- A. Fault of man not observing instructions.
- B. Fault of maintenance making observance impossible or spoiling results.
- C. Fault of supplies, the quality or quantity of which was not per standard requirements.
- D. Fault of planning department issuing wrong instructions, or at a wrong time, or failing to provide necessary implements, training, etc.

Lost-bonus slip issue is an authority and order for immediate investigation, and upon the receipt of the report, steps are at once taken to prevent similar

7 11 1914
 HAVE INVESTIGATED AND REPORT BELOW THE CAUSE OF LOST BONUS
 DEPT. Power
 DISTR. W.R.
 BY John Doe ON JOB OREX
 CONDITION neglect to take rest at specified time. Delivered too much coal at first, then slackened
 RESPONSIBILITY IS ALLOCATED TO coal passer
 REMEDY ATTACHED TO BY ME additional instructions
 J.M.D.

FIG. 18. Report Slip Showing Cause of Lost Bonus.

occurrences. Whenever it is established that the man is not to be blamed, his bonus is allowed and this payment is charged against administration expenses.

22. The general idea as to what form of organization comprises all essential features necessary for successful carrying out of the planning work is exemplified by the chart, Fig. 19, and the standing order describing it:

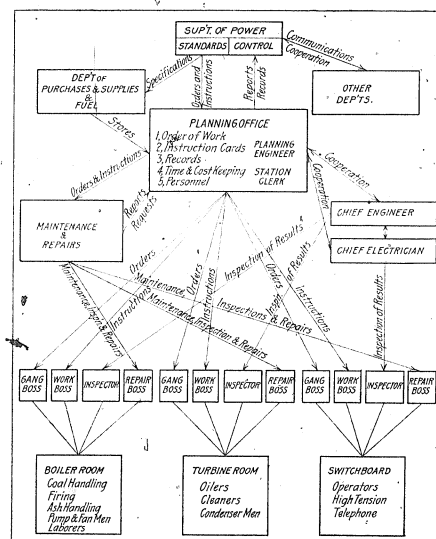


FIG. 19. Organization Chart for Large Central Station.

STANDING ORDER NO. 5

Subject Organization Chart
 Written October 8, 1914
 To go into effect October 15, 1914
 Superseding . . . All previous verbal and written orders
 Affecting Cos Cob Organization
 A. Object of Order.

This order is issued to clearly define the organization chart of the Cos Cob Power Plant of the New York, New Haven & Hartford Railroad Co., showing the division of duties of various officials and their subordinates.

B. Description of Organization Chart.

See Exhibit "A."

This chart is based on functional management instead of line foremanship. It shows to whom each department and member of the organization is responsible for different functions.

The arrows show the direction in which the order of work, instruction, requests and reports are transmitted.

C. Definition of Sections:

The organization of plant is engaged upon two different kinds of work—planning and execution.

D. Planning Section:

The planning office is under the supervision of the superintendent, and the planning engineer in charge of the office is responsible to him.

The functions of the planning office are as follows: (a) Order of work; (b) Instruction cards; (c) records; (d) time and cost keeping; (e) personnel, including discipline.

The planning office receives all requests and cooperates with: (a) Chief engineer; (b) chief electrician; (c) chief maintenance man.

The planning office reports to the superintendent of power on the progress of work and success of methods and transmits to the office of the superintendent of power all records kept in the plant.

The organization of cooperation with other departments, ordering and receiving supplies, material, and outside help is performed by the planning office through the office of the superintendent of power.

The planning engineer is made responsible for all work performed in his office and for the living up to the standards and instructions worked out by the chief engineer, chief electrician or chief maintenance man, and approved by the superintendent of power.

E. Executive Section:

The chief executive of the plant is the chief engineer, and all employees of the plant are responsible to him for the proper discharge of their duties, discipline and living up to the planning-office orders.

F. Chief Electrician:

The chief electrician is responsible, for the results obtained in his department, to the chief engineer and reports to him.

G. Chief Maintenance Man:

The chief maintenance man is responsible to the chief engineer as to result of the work in his department and reports and receives orders through the planning office.

H. Functional Foremen:

The entire plant is divided into three groups: (a) boiler room; (b) turbine room; (c) switchboard and electric department.

The work in each of these departments is directed and inspected by four functional foremen, as follows: (a) gang boss; (b) work boss; (c) inspector; (d) repair boss.

I. Gang Boss:

He takes charge of the preparation of conditions necessary for performing the work in his department.

In the boiler room he sees that coal is delivered to the stokers in time and in the necessary quantity to each boiler; that water is fed to the boilers in the proper manner by the proper pump; that each man has definite boilers assigned to him, and that all necessary firing tools, instruction cards, instruments, etc., are given to the men.

In the turbine room he sees that the valves are set right; that the piping is properly connected; that auxiliaries are in readiness for operation; that all assistants and oilers are assigned to their respective jobs; that each unit, except those taken out for repair, is ready for service at a moment's notice, and that men attending the equipment are supplied with proper instructions, tools, instruments, etc.

On the switchboard the gang boss sees that all high-tension equipment is properly connected; that switches and instruments are in readiness for use; that those affected in any way are properly tagged and instructions and orders from the chief electrician, planning department and load dispatcher are transmitted to the men in an unmistakable way; that each man on the switchboard and in the high-tension room has definite duties assigned to him, and that all necessary instructions and implements are given to the men.

J. Work Boss:

He is responsible as to how the work is performed by his men, and it is his duty to instruct the men how to work in accordance with the standards prescribed on their instruction cards.

The work boss of the boiler room sees that the coal is fed into the furnace at the proper rate; that stoker engines and mechanisms are running at the right speed; that the depth of fuel is in accordance with instruction cards; also that the draft is always in accordance with instructions for the given rate of drive. He instructs the firemen when to shake grates, and when and how to clean fires. He must not only advise his men how best to do their work, but must actually demonstrate the best way of doing it, and he constantly trains the firemen.

The work boss in the turbine room sees that all valves and governors are operated in the right manner; that turbines, engines and auxiliaries are running