

## Steam Generation

Fuel, labor and maintenance are the three big elements of steam cost. These are the key to sound steam-plant modernization. Fig. 1 (a typical plant) reminds us that fuel and wages have climbed to dizzy heights since 1930. Fig. 2 sums up Federal Power Commission statistics for all Class A and B private utilities. Note that maintenance costs, mills per kw-hr, have almost doubled since 1941. Fuel costs, mills per kw-hr, are up about 50%. Fig. 3 plots fixed charges for coal handling (as determined by Fairmont Coal Bureau) for plants of various sizes.

These curves show why automatic controls, fuel- and ash-handling equipment, and other labor-saving devices are such attractive investments today and suggest that they will be even more indispensable in years to come. Certainly fuel prices will keep on climbing—probably wages too.

Any comparison of the new and old must consider not only fuel, and other operating costs, but also maintenance. Usually the renovated steam plant will cost much less to maintain. Try to estimate how much less.

Go all out to defate future maintenance costs. Pick equipment of proved reliability and accessibility and units that can be served mainly by scheduled periodic overhauls rather than by the

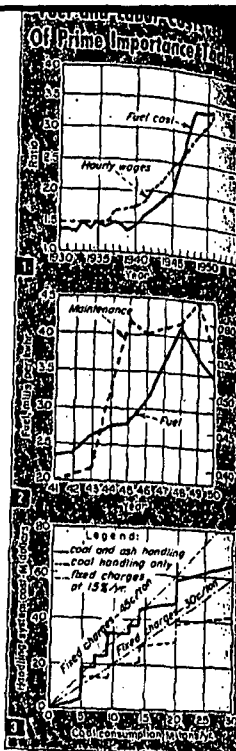
"fire brigade" repair gang. And provide the tools and other facilities for rapid overhaul.

Table 1 shows the results of a professional steam modernization survey in a papermill power plant. The results are specific for only this plant, but the tabulating form used is a good guide for others. Many plants could make as good a showing with new steam units and better hookups.

A consulting engineer made this survey. It took a lot of time and cost real money. For example, all lines whose steam consumption affected the appraisal were fitted with orifices to measure flow. Here, as usual, cost of digging out the facts paid off in sound conclusions and genuine savings. Knowing totals is not enough; to make maximum steam savings you have to find out just where your operating dollars are wasted.

In this case the survey showed that 18% of the Btus in all the coal fired was running down the sewer in the turbine condenser cooling water. Eliminating condensing turbines, and switching from steam to motor drive throughout plant permitted jacking the electrical load and cutting heat losses.

Every plant is a special case, but most have a "steam tapeworm" somewhere in their systems. Study Table 1 to get (Continued on page 67)



### I: Steam Survey for a Paper Mill

| Item                                                    | Old operation | New operation | Decrease in Btu needed | Estimated savings in Btu per hour |
|---------------------------------------------------------|---------------|---------------|------------------------|-----------------------------------|
| Paper drying                                            | 1290          | 1290          | 0                      | 71,100                            |
| Heating process water                                   | 1260          | 1260          | 0                      | 27,200                            |
| Heating boiler feedwater                                | 615           | 427           | 188                    | 9250                              |
| Turbine-steam, condensing water to sewer                | 2660          | eliminated    | 2660                   | 9                                 |
| Corrugators                                             | 303           | 303           | 0                      | 6550                              |
| Heat equivalent for much & else saved                   | 1160          | 885           | 275                    | 19,150                            |
| Mix and exhausted to atmosphere                         | 727           | 50            | 677                    | 1020                              |
| Straw cookers                                           | 221           | 221           | 0                      | 4760                              |
| Building heating and miscellaneous                      | 402           | 402           | 0                      | 8640                              |
| Boiler-room losses                                      | 3780          | 1287          | 2493                   | —                                 |
| Total Btu supplied to coal per pound of paper           | 16,618        | 8135          | 8483                   | —                                 |
| Steam per hour                                          | —             | —             | —                      | 147,770                           |
| Equivalent pounds of 15,000 Btu coal per pound of paper | 1.073         | .598          | .475                   | —                                 |

### II: Points to Consider Before Construction

|                     |                        |
|---------------------|------------------------|
| Storage areas       | Labor                  |
| Temporary buildings | Construction equipment |
| Parking space       | Construction staff     |
| Temporary services  | Personnel manager      |
| Commissary          | Laws and regulations   |
|                     | Construction manual    |

### III: How a Schedule Speeds Construction

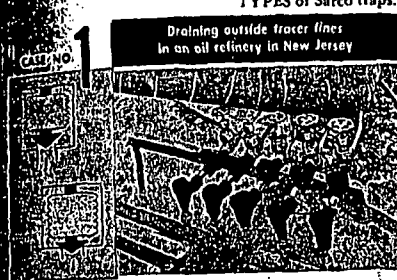
- 1 Material ordered in sequence for delivery when needed
- 2 Contractor knows when ordered material will arrive
- 3 Major equipment set on permanent foundation as delivered. This reduces storage and extra handling
- 4 Provision can be made for early or late unit delivery
- 5 Time clearly defined to complete each phase of job
- 6 Testing, checking, adjusting time after the installation is included in schedule
- 7 Contractor can estimate the most efficient labor force needed for each phase of job

## here's why they selected 4 different types of steam traps for 4 different applications

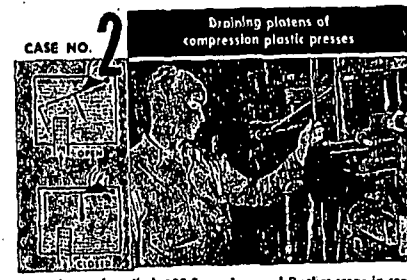
CONDITIONS under which steam traps must operate vary widely, but there is for every service one type that gives maximum efficiency.

Sarco makes the 4 distinctly different TYPES of steam traps shown below. Therefore, Sarco can give you impartial advice on the best choice for your particular installation.

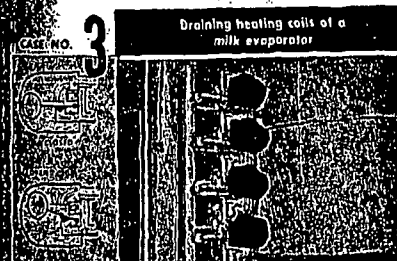
For each of the 4 jobs listed below, the users selected four different TYPES of Sarco traps.



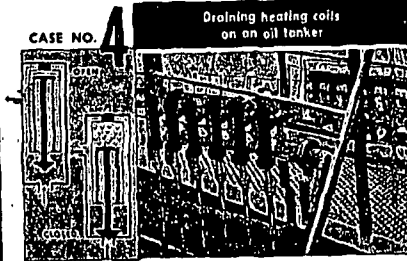
Type of trap installed: Sarco No. 9 thermostatic traps. Why selected: Being thermostatic, they are steam misers. Can't freeze, being wide open when cold. Easy to maintain since only the bellows moves. Small, light and easy to install. Self-adjusting for different pressures.



Type of traps installed: 100 Sarco Inverted Bucket traps in service for 17 years. Why selected: Press platens have small horizontal steam spaces; the intermittent blast discharge of these Sarco traps scours the heating surface. Built-in strainer cuts maintenance costs.



Type of trap installed: Sarco Float-Thermostatic Trap. Why selected: Heating surfaces of the coils must be kept full of live steam—this Sarco trap discharges condensate as it collects. Can't airbind because the integral thermostatic vent gets rid of air, regardless of operating steam pressure and temperature. As shown in sketch 3 above, this vent does not depend upon the discharge of condensate.



Type of traps installed: Sarco LIQUID EXPANSION traps No. 871. Why selected: Traps on tankers are exposed to freezing weather and vibration. Sarco's No. 871 traps can't freeze; resist vibration, water-hammer, pressure pulsations and superheat. These traps discharge condensate at adjustable temperatures below 212°F., permitting use of some of the condensate's sensible heat.

Write today for Bulletin No. 145-A: Selecting the Right TYPE Steam Trap. Sarco Company, Inc., Empire State Bldg., New York 1, N. Y. Represented in principal cities. Sarco Canada Ltd., Toronto 8, Ontario.

**SARCO** saves steam  
improves product quality and output