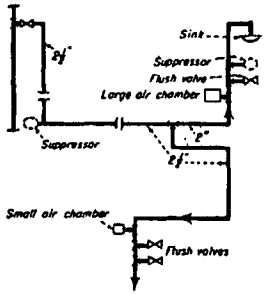
More PLANT PROBLEMS

Begins on page

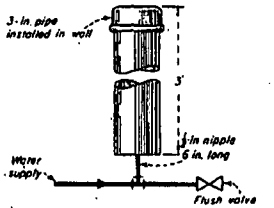


when line pressure becomes excessive (2) metallic bellows that expand when pressure rises (3) flexible containers filled with gas that is compressed by a pressure rise. All these devices are effective when applied right.

One common and cheap way of solving water-hammer problems in the plant is with air chambers, shown in sketches above. With flow rate of 7 fps and static pressure of 25 psi, shock pressure is about 425 psi. Shock-wave velocity is about 4400 fps for line sizes in *CH's* installation. Wall thickness of his piping is sufficient to withstand the shock.

Air chambers having the dimensions shown and located as detailed in piping sketch do a good job. Recharge the chambers periodically because the trapped air dissolves in the water.

A J Breugelmans *New York*



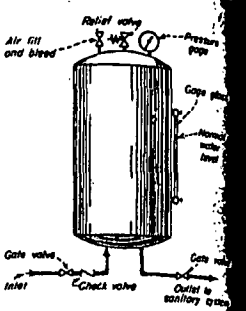
SUPPRESSOR, installed in wall behind flush valves, as in sketch, does a good job. Be sure there is air in it at all times. Results are good.

John D Phillips *Dayton, O.*

CUSHION CHAMBERS at each dead-end of the piping system help reduce noise. If these don't help, install vibration dampers or short sections of flexible hose at random points to break up the continuous lengths of pipe. Don't place anchors too close to dampeners or flexible hoses.

From *CH's* description it looks as though his flush valves close too quickly. Lowering inlet pressure or adjusting valve is one way of preventing this trouble in the future.

Melvin Evans *Chicago, Ill.*



ADJUST FLUSH VALVES to close slowly and almost all or all water hammer will end. Most flush valves close rather sharply and there isn't too much you can do about it in some designs.

CH can obtain a positive cure by installing a pressure tank of about 150-gal capacity on the inlet to sanitary system sketch. Keep tank about 2/3 full of water and about 1/3 full of air. Air absorbs reverse-flow shock, may be fed into the tank from the plant compressed air system, if desired.

John J Geist *Brooklyn, N. Y.*

MAXIMUM SHOCK occurs at flush valve and faucet when valves close and flow suddenly stops. Best place to cushion shock is in the branch lines just ahead

(*Continued on page 220*).

YOUR NEW PROBLEMS FOR MARCH

1 Is This Stack The Right Size?

The steel stack for our new boiler is to be 50-in. dia, 150-ft height above boiler-room floor.

Boiler is rated at 20,000 lb per hr, 125 psig, 353 F. Feed temperature is 212 F, gas leaves boiler at 585 F. There is no heat recovery. CO, leaving furnace is 14%, leaving boiler 13.5%.

Losses expected are: dry gas 12.5%, H, and moisture in pulverized-coal fuel 4.8, moisture in air 0.30, unburned combustible 1.5, radiation 1.2, unaccounted for 1.5%.

Guaranteed boiler efficiency is 78.4%; average draft loss through boiler is 0.60 in. H_2O, required draft at entrance to first pass 0.15 in. H_2O, furnace draft needed at minimum rating 0.05 in. H_2O.

Proximate fuel analysis is: moisture 2.88%, volatile 36.0, carbon 52.36, ash 8.76%.

I don't think stack size recommended to us is right. Have *Power* readers ever run into a problem like this? What's best way to check stack size? Is size recommended correct?—*GK*

2 Why Is Diesel Piston Worn?

One piston of our 4-cycle 8-cyl 1000-hp diesel is worn oval about 0.015 in. on the thrust side, and the rings are worn the same way. Liner shows normal wear with no scoring.

Recently we put in a new piston and ran for three hours. Then the wrist pin got hot and the piston scored the liner.

Checking the engine we found that outside lubricator supplying oil to the pistons was working right when scoring occurred. We now get a noise from this cylinder that sounds like a piston slap. Since engine is only 11 months old and all pistons are the correct size we're wondering what is causing our trouble.

Why did piston wear oval in such a short time? What's best way to repair piston and liner? How can we avoid this trouble in the future?—*BB*

Will you help readers who sent us problems? Extra pay for photos or sketches