cable pressure AirMAIL
System Studies Incorporated

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Back to Basics

Every once in a while we'll thumb through the archives and pull out some pertinent cable pressurization topics that we haven't discussed in a while. Since much of our philosophy regarding cable pressurization leak locating, and even product development, is based on air flow measurement and analysis, we thought we'd share some of our insights.

In this AirMAIL issue we'll define Optimum Air Usage, describe two ways to calculate it, and explain why it's essential for prioritizing your leak locating efforts. We'll also address some of the important ways that air flow measurements can aid in your leak locating efforts.

We encourage you to give us your feedback about the information presented, or suggest possible topics for another bulletin. Please contact us at (800) 247-8255 or via email.

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OAU Defined

Optimum Air Usage (OAU) is an allowable air consumption rate that can be calculated for an individual air source or an entire pipe/cable route. Since it is impossible to maintain a totally airtight cable pressurization system—due to environmental conditions, man-made leaks, etc.—a certain amount of air escaping from the system can be expected.

Over the years two accepted methods of determining Optimum Air Usage have evolved. One requires that you count the number of sheath miles of cable that are fed by an air source and multiply the total by 1.25 SCFH (30 SCFD). An obvious problem with this method is deciding how much (what length) of cable should be included in the count. While there are guidelines that can help you achieve consistent sheath mileage counts, offering a detailed explanation here is beyond the scope of this article.

An easier and equally acceptable method of determining OAU for a particular air source is to assign a flow value for each pressure tube that supplies air to a cable. In air pipe systems with manifold spacing of 3,000 feet or 6,000 feet, 2 SCFH per tube is generally acceptable. With closer manifold spacing, such as 1,000 or 1,500 feet, 5 SCFH per tube is more practical. This higher air flow allowance is necessary due to the higher air consumption in systems with closer manifold spacing (the pneumatic sections between air sources are shorter and, so, there is less pneumatic resistance).

The important thing is to assign an OAU value for each air source in your cable pressurization system. This is particularly true for flow transducers, since OAUs are used by PressureMAP™ for dispatching and alarming. We recommend that you take the time to look at each flow transducer in your system and make sure an OAU has been assigned.

Speaking of Air Flow . . .

Ever hear a statement similar to this—"I don't care how much air I use as long as I have good cable pressure." While it's true that the name of the game is pressure, measuring and using air flow information is a proven means to that end.

Measuring air flow is essential in maintaining a cable pressurization system for several reasons:

- If your air pipe is using too much air, the delivery pressure will drop. And it's pretty tough to keep 5 psi of air in a cable when air pipe delivery pressure is only 2 or 3 psi.
- If there are 1000 leaks in a central office and you only have enough time to fix 100 of them, you want to find the 100 most damaging leaks. They're the ones that are pulling down delivery pressures. Measuring air flow is way of prioritizing and locating the biggest leaks first.
- Also, did you know that if there are two leaking lateral cables being fed by a main feeder cable, the lateral that is consuming the most air (and not necessarily the one with the lower pressure) is the one that is doing more to pull down the main feeder cable—

That's why it's always important to keep an eye on air consumption. Pressure readings give you part of the information needed to maintain an air pressure system, but careful air flow measurement and analysis lead to much greater leak locating success.

Made In USA

We're proud to say that all of the products offered to our customers are manufactured here in the United States of America. In these increasingly difficult economic times, you can take satisfaction in knowing that your System Studies purchases are helping to keep U.S. workers on the payroll.

How Much Cable Can You Feed with an Air Pipe?

When an engineer for a water department installs a new water main, he or she sizes the pipe based on the potential number of customers in the area that the pipe will feed. Knowing that an average household uses "x" amount of cubic feet of water, the engineer can size the pipe accordingly. Logically, the more customers there are, the bigger the diameter of the pipe must be.

When a cable pressure engineer is specifying air pipe for a system, he or she faces a similar, but slightly different problem. While the number of pressurized sheath miles of cable being fed varies, the engineer can select from only two pipe diameter sizes.

It has been calculated that the standard ½" CA 3131 air pipe used throughout the telephone industry can feed up to 20 sheath miles of pressurized cable. (This amount is less in offices with closer manifold spacing.) Adequate delivery pressure may be hindered if more than 20 sheath miles of cable are being fed from one pipe.

If the total sheath mileage on the route exceeds this requirement, engineers have the option of placing additional ½" air pipes or specifying that a 1" air pipe be used. Even though the diameter of the 1" pipe is only twice that of the smaller pipe, a single 1" air pipe can supply as much air as four or five ½" pipes. The reason for this is that there is very little pressure drop per foot with the larger diameter air pipe.

As illustrated below, engineering can and does have a major impact on maintaining minimum delivery pressures. Like the water company engineer, the cable pressurization engineer must be acutely aware of existing and potential customer demand (sheath mileage). He or she can use a combination of 1" and 1/2" air pipes to ensure that adequate delivery pressure is supplied to all of the cables.