cable pressure AirMAIL
System Studies Incorporated

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What's In This Issue

We've been hearing new concerns lately from some of our telephone company friends about the mounting expense of using nitrogen tanks in single feed air pressure systems to supplement air feed from central office dryers. It's a continual problem in some areas, but one that does not have to go unaddressed. In this bulletin we describe some methods and equipment that can help you rein in your tank replacement and refill costs. Take a look at the article below.

The second article describes our **Flow Bank** equipment and how it can be used in place of a supplemental air source to help maintain adequate cable pressures in a single feed air pressure system. You will also be introduced to our **Flow Direction Gauge**, which provides important air flow information for each cable that is pneumatically connected to the Flow Bank. For more information about this equipment or air tank usage issues in general, please call the System Studies office toll free on 800-247-8255.

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Focusing on Nitrogen Tank Cost Reduction

In some Operating Companies one of the only ways to keep air core cables pressurized is to use nitrogen tanks. When duct space is unavailable for placing air pipe, or damaged ducts make placement impossible, using multiple nitrogen tanks along cable routes may be the only option for protecting the cables. Problem is, there's a major price tag involved—one that needs to be paid and repaid and repaid for as long as the nitrogen tanks are in use.

First of all there's the expense of refilling a nitrogen tank, then there's the associated labor (driving to the site, setting up, removing and replacing the empty bottle, etc.). Some estimates suggest that the labor cost for replacing a single empty nitrogen tank could be $100 or more. In a district with hundreds of nitrogen tanks in use, this equates to a huge annual expense for the operating company.

In this AirMail bulletin, we provide a general game plan for significantly reducing the cost of using nitrogen tanks for air pressure protection. We explain how to go after the "low hanging fruit" to reduce tank replacement costs and how to use and install some simple equipment that will help to improve cable pressure protection in multiple tank-fed cables.

The Game Plan

Our approach to reducing ongoing nitrogen tank costs is a three-step process that focuses on air flow information for identifying how long a nitrogen tank will last, observing tank replacement tendencies, and implementing a simple design improvement.

Step 1 In some areas neither managers nor technicians fully understand the importance of air flow as it relates to cable pressurization and, particularly, for determining the capacity of an air tank. For example, a common air tank holds 220 standard cubic feet (scf) of compressed air, and a liquid nitrogen tank holds 3600 scf of gas. If the smaller tank flows 1 standard cubic foot per hour (scfh), as measured with a Flow Finder or portable flow rater, it will last approximately 220 hours before it empties (220 scf divided by 1 scfh.) That's over nine days. Conversely, a 220 scf tank that flows 10 scfh will only last 22 hours.

The idea is to identify these high flowing tanks using air flow information, perform leak locating to reduce air consumption, if possible, and modify tank replacement procedures to accommodate high output requirements. We're confident we can help you save big dollars each month using this approach to reduce tank flow rates and prolong replacement intervals.

Step 2 If you outsource your nitrogen tank replacements and refills, it is important to keep a close eye on things. For example, a liquid nitrogen tank that is flowing 10 standard cubic feet per hour it will last 360 hours, or 15 days (3600 scf divided by 10 scfh divided by 24 hours). A smaller 220 scf air tank that flows only 0.5 scfh, for example, will last just over 18 days (220 scf divided by .5 scfh divided by 24 hours).

In both examples you are pouring money down the drain if you're paying someone to refill these tanks on a scheduled weekly basis. Essentially, they are taking home a half-full tank and replacing it with a full one. That's why it's important to measure air consumption so you can adjust your tank refill/replacement schedule when necessary.

By the way, we happen to known that, in some areas, nitrogen tanks are used on routes that also have air pipe feeding the cables. If an air pipe does not feed an excessive number of sheath miles of cable, it makes sense (protection-wise and cost-wise) to replace the tanks on that route with air pipe manifolds. If you do install manifolds on a route, you can also convert the air pressure design to 3,000 foot manifold spacing. Not only does replacing nitrogen tanks with manifolds provide an option for remote monitoring of pressure and flow rates, the closer manifold spacing also provides better cable protection and improves leak locating. (Here's a dirty little secret: High flowing cable leaks are the easiest ones to find!) And using air feed from the central dryer(s) is essentially free; it will not require paying any additional dollars.

Focusing on Nitrogen Tank Cost Reduction (continued)

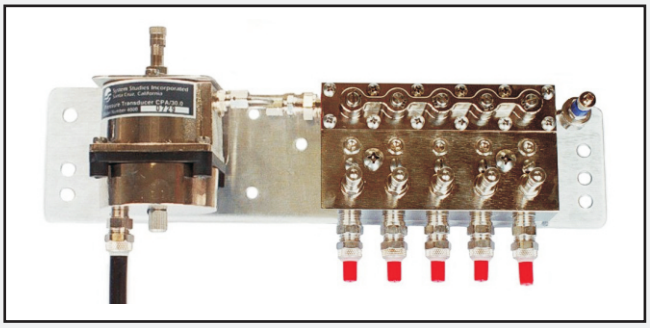
Step 3 Some air pressure systems that use nitrogen tanks were never designed for optimum air pressure protection. Cables commonly extend long distances from a source of air, and the internal pressure drop can be extreme. Consider a 1800 pair, 26 gauge pulp cable that continues 4,000 feet from the air source. Even a small 0.5 scfh leak located near the end of the cable will result in a 8 psi pressure drop in this cable. Obviously, another air source needs to feed this cable closer to the end.

In systems without air pipe, System Studies recommends installing Flow Banks (see information below) to help raise and equalize cable pressures in a nitrogen tank-fed system. The Flow Bank is a simple device that makes it possible to tie pneumatically-loose PIC cables together with tighter pulp cables. Flow Banks are also equipped with tank valves that enable you to measure individual cable pressure and flow rates to assist in leak locating. For remote monitoring they can be ordered on a bracket assembly equipped with a pressure transducer.

We would like to partner with you to help address your nitrogen tank usage. We can't guarantee to eliminate all your nitrogen tanks, but we can certainly help you take a big bite out of your yearly tank dollars. If you are interested, give the Field Engineer in you area a call (below) to find out more, or call us at our Santa Cruz office (800-247-8255).

The Flow Bank System

As mentioned above, our **Flow Bank**™ is a mechanical device that joins cables together pneumatically. Designed to be installed at multiple locations in a single feed air pressure system, Flow Banks re-route the existing air supply from the cables and provide dual feed cable pressure protection. To provide remote monitoring at the Flow Bank installation, the device is also supplied on a stainless steel mounting bracket and pneumatically plumbed to a High Resolution Pressure Transducer (below).



Unlike a Flow Finder Manifold™, the Flow Bank is not supplied air from an air pipe or auxiliary air source. It simply distributes air from cables that have adequate or higher pressures to those with lower pressures. For example, when a leak develops in a Flow Bank System, the Flow Banks closest to the leak (typically, on opposite sides) draw air from the cables with higher pressure and route it into the cable with the lowest pressure. The combined contribution from the higher pressure cables significantly improves overall pressure protection to the leaking cable.

Because Flow Banks effectively stabilize pressure among the cables, they are ideally suited for a single feed as an alternative to using multiple nitrogen cylinders on a route.

Flow Banks are equipped with five ports, each containing a 0-.95 SCFH Flow Finder™ and a shutoff valve. The Flow Finders create a slight pressure differential that can be measured and converted to a flow rate using a specially designed Flow Direction Gauge™ (see right). This gauge not only measures individual air flow rates, it also indicates if the air is flowing from the Flow Bank into a cable or from a cable into the bank.

Each Flow Bank port also includes a small flow restrictor than limits the maximum flow rate through the port to approximately 2 SCFH. This prevents the Flow Bank from pulling too much air from a high pressure cable and jeopardizing cable pressure protection in that cable.

Reading the Flow Bank

Our specially designed **Flow Direction Gauge**™ provides both an accurate air flow reading and an indication of the direction of the flow. This important information is used for leak locating in the Flow Bank System.

The gauge is supplied with two color-coded quick-connect samplers (which greatly simplify the flow reading process), a carrying strap and a case. The gauge face scale indicates both flow direction and the flow rate in SCFH.

If you would like to learn more about the Flow Bank System, please give us a call. Additional information about the products can be found in these data sheets at www.airtalk.com (Flow Bank and Flow Direction Gauge) and in our on-line Product Catalog.