

## The Ins and Outs of

# Tubular Parts Cleaning

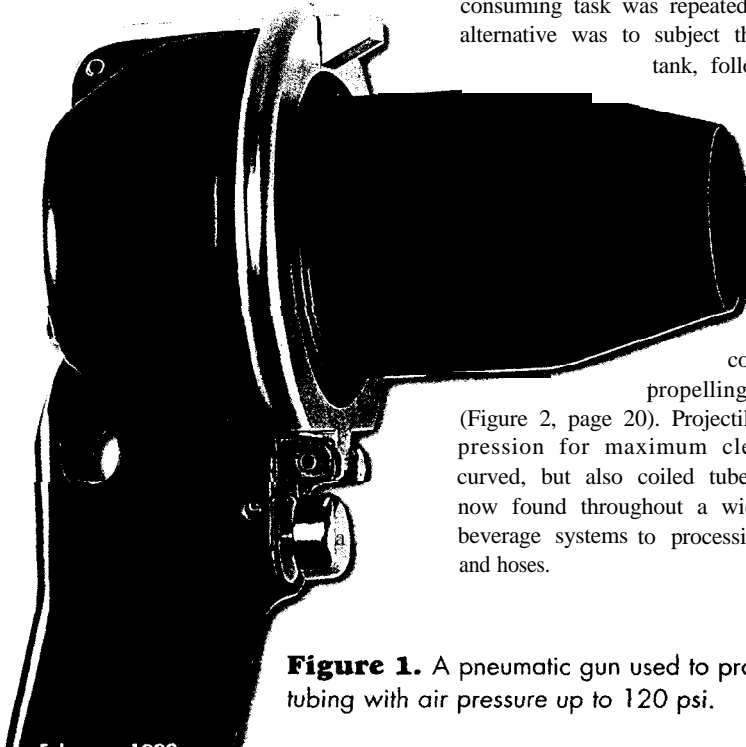
Chemical flushing too costly? Manual brushing and scraping too time-consuming? New methods of tube cleaning, such as pneumatic gun and rotary brush systems, may be the solution to your present challenges.

by Steve Spielmann

**T**raditionally, cleaning the interiors of tubes, pipes, and hose components relied on manual or chemical methods. This applied to newly manufactured components, requiring removal of lubricants, chips, and swarf before shipping or assembly, as well as to existing components during routine maintenance procedures.

When a tubular furniture manufacturer, for example, needed to clean oils and metal swarf from the inside of tube sections after machining and bending, the standard procedure called for pushing and pulling a clean rag on a wire through the tube. This very time-consuming task was repeated until the final rag came out clean. An alternative was to subject the tube to a chemical bath in a soak tank, followed by fresh-water pressure rinses.

Today, the same manufacturer would be able to clean all tube interiors with a pneumatic cleaning gun (Figure 1) that uses 90- to 120-psi shop air to propel foam projectiles through the tube. Gun nozzles and projectiles accommodate tubes from ¼-inch to 2 inches in diameter. As a projectile is shot from the gun, it compresses and expands, loosening and propelling dirt and deposits through the tube (Figure 2, page 20). Projectiles are oversized to ensure proper compression for maximum cleaning action. They clean not only curved, but also coiled tubes. These pneumatic cleaning guns are now found throughout a wide range of industries, from food and beverage systems to processing lines, fuel lines, and hydraulic lines and hoses.



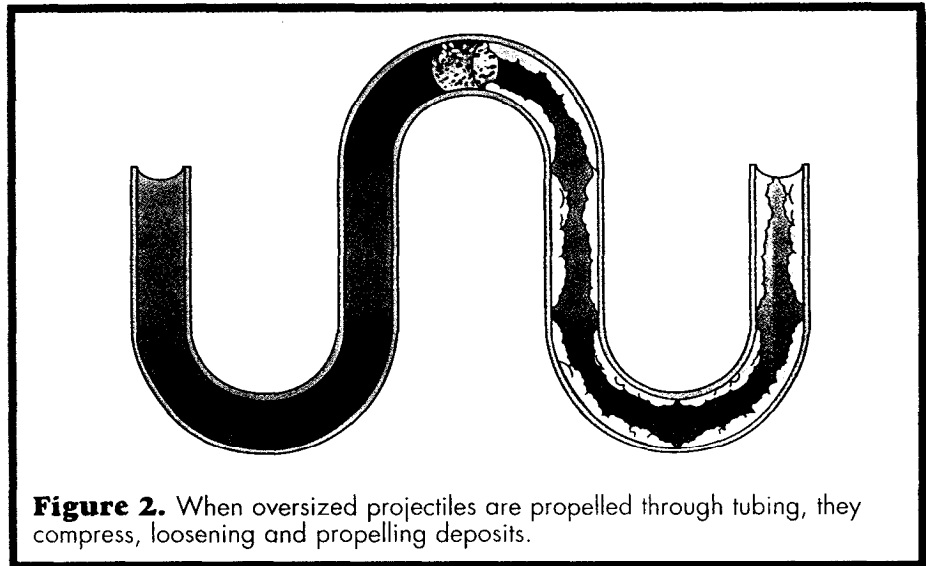
**Figure 1.** A pneumatic gun used to propel foam projectiles through tubing with air pressure up to 120 psi.

### From Rags to Riches?

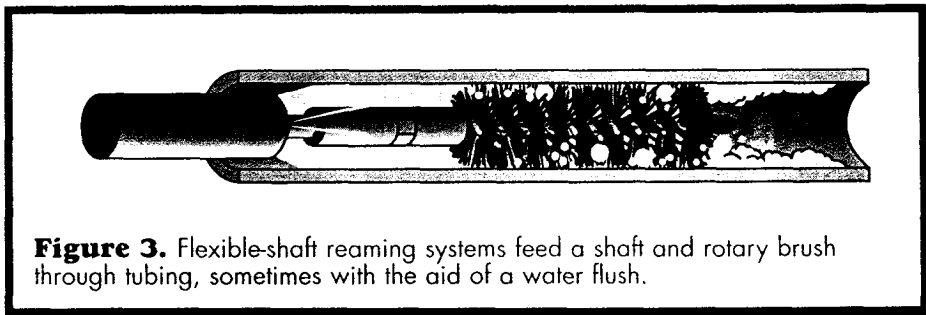
Pneumatic guns have proven to be extremely efficient compared with the manual wire-and-rag cleaning process, and they accomplish the task in much less time. It is also important to note that these devices have eliminated the need for chemical bath cleaning in many applications, a costly practice that is potentially harmful to workers and the environment.

For original equipment manufacturing companies, where pre-assembly (eg, cutting, crimping, threading, tapping, and deburring) is frequently required, it is important that a tube be thoroughly cleaned before assembly. The cleaning projectiles employed in such facilities are made of polyurethane in various densities. Each projectile has physical properties that allow it to compress, expand, and bend in fractions of a second as it is propelled through tubing, some of which can be hundreds of feet long and very intricate.

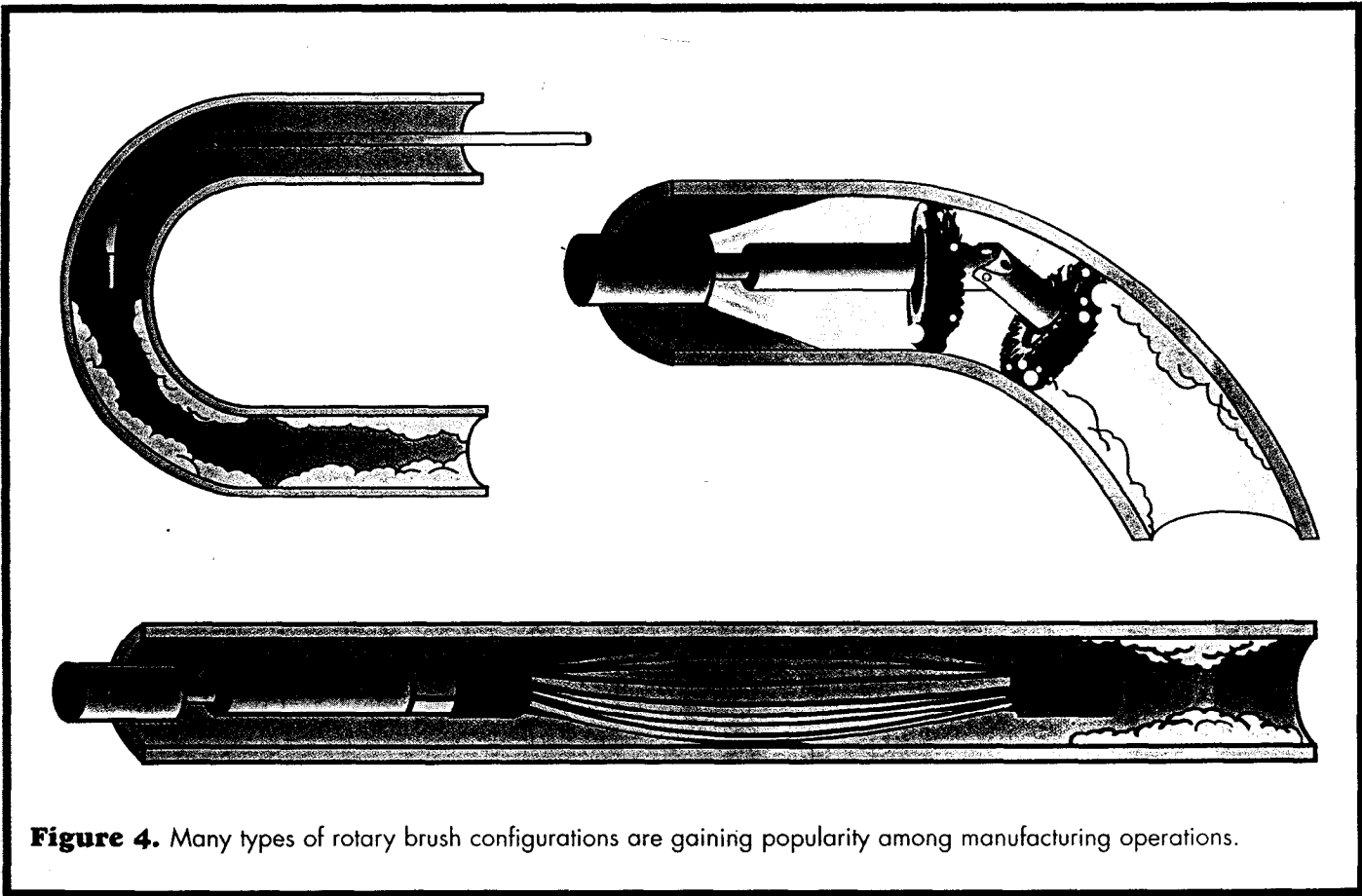
There are often many obstacles along the way from beginning to end of a tube. Fittings, such as JIC couplings, must be considered when cleaning such items as hydraulic hoses. The projectile must contract and expand through these couplings,



**Figure 2.** When oversized projectiles are propelled through tubing, they compress, loosening and propelling deposits.



**Figure 3.** Flexible-shaft reaming systems feed a shaft and rotary brush through tubing, sometimes with the aid of a water flush.



**Figure 4.** Many types of rotary brush configurations are gaining popularity among manufacturing operations.

while still accomplishing a thorough cleaning action. In cases of extremely oil- and swarf-laden tubular components, it may take several projectiles to do the job. However, considering that a projectile can travel the length of a hundred-foot tube or hose—straight or curved—in about one second, the cleaning process is still extremely fast.

#### Expanding Options

An invaluable resource for companies like that tubular furniture manufacturer, the pneumatic-gun projectile system is also finding strong acceptance in more high-tech applications. Such systems have been employed for cleaning aircraft hydraulic lines and processing equipment prior to assembly and during formulation changeovers. Pneumatic guns have also been used in the pharmaceutical industry and in cleaning operations involving equipment subject to high rotational speeds (eg, vulcan spindles), where contamination not removed before final assembly could cause dangerous out-of-balance conditions during operation.

In cleaning highly contaminated tubular components and those larger than 2 inches in diameter, new rotary brush systems have

been replacing chemical cleaning, hydro-blasting, and labor-intensive rod-and-brush cleaning. The rod-and-brush method is rather unpleasant and thus often put off until cleaning is absolutely necessary. This two-step cleaning method involves the operator manually brushing out the tubes and then flushing them with a water hose. Often, the residue left in the tube after brushing dries back onto the tube wall before being flushed.

Newly developed flexible-shaft automatic reaming systems save time in applications that require scrubbing. These systems mechanically feed a shaft and rotary brush through the tubes at high speed, operating dry or with water flush (Figure 3). Brushes can run the gamut from nylon to brass to stainless steel, depending on the type of tube and the degree of cleaning required. U-tube brushes, wheel brush assemblies, honing tools, and huffing tools for tubes and pipes—often used in combination with vacuum systems—are fast becoming integral parts of many manufacturing operations (Figure 4).

Special huffing and brush applications are now being used for purposes beyond

cleaning. For example, many such systems are used to prepare new tube components for anodizing or plating. These systems are also quite useful in removing welding residue during manufacturing. Automatic reaming equipment has become a practical tool in such systems as boilers, condensers, heat exchangers, oil coolers, and other tubular-based equipment during the fabrication and final assembly.

As the old manual and chemical methods of tube cleaning continue to prove costly and time-consuming, more and more companies are finding an excellent alternative in the newly available mechanical and pneumatic systems. These new devices are rapidly establishing a prominent reputation as the state-of-the-art in fast, economical, and efficient tube cleaning. n

#### About the Author

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