The definition of “lean manufacturing” (see Sidebar) has, over the past decade or so, come to be fairly widely and well understood across American industry. But one must wonder how accurately it has been applied in our segment of industry.

Perusing the literature, it appears that the meaning of “lean” has been stretched to include virtually every positive virtue imaginable, from “compact” to “green.” At the very least, it appears to have become a convenient catch phrase for equipment manufacturers’ marketing managers—a buzzword more or less synonymous with what many would simply call “common sense.”

If you want to “lean down” your time spent on reading this column, the overall conclusion is that this author believes that one can freely substitute the phrase “common sense” for the phrase “lean manufacturing.”

AN INTERNET JOURNEY
Here is how some well-known suppliers of cleaning process equipment relate their products to the concept of lean manufacturing:

- “...simplifies maintenance through a common sense approach to component choice and placement for quick and efficient access and servicing ...”
- “...thoughtfully engineered and manufactured from the ground up to be flexible, durable, simple to use, and easy to maintain ...”
- “...design saves floor space ... small footprint ... ergonomic loading ... automatic hands-free operation ... low operating cost ...”
- “...compact spray-immersion cleaning system designed to easily fit into any LEAN production cell to produce clean and dry parts at minimal costs ...”
- “...The fundamental principal of lean manufacturing is the elimination of waste and cost ...”
- “...Narrow width design for proper fit in a lean cell environment ...”
- “...engineers strive to produce functional, user friendly designs, that are easy to access and maintain ...”

So that is what lean manufacturing means in our industry: simple, flexible, ergonomic, compact, low-cost, proper fit, etc. Isn’t that what we had been doing all along?

SIDE BAR
From businessdictionary.com: “...Doing more with less by employing ‘lean thinking,’ Lean production involves never ending efforts to eliminate or reduce ‘muda’ (Japanese for waste or any activity that consumes resources without adding value) in design, manufacturing, distribution, and customer service processes. Developed by the Toyota executive Taiichi Ohno (1912–90) during the post-Second World War reconstruction period in Japan, and popularized by James P. Womack and Daniel T. Jones in their 1996 book Lean Thinking....”

Is the phrase “lean manufacturing” only a marketing expression? No—it is more than that.

CHANGE REPEATED
As our country swaps out political parties and fashionistas discard the old in favor of the new, so do operating managers change from preferring large central parts washers to small-sited parts washers. Today, we call the latter units “cellular,” and their use is common in lean manufacturing.

The former parts washers have a large footprint and are price-intensive, but they are highly productive and usually have a low cost per cleaned part. The latter parts wash-
ers are the opposite: located where there is specialized work to be done. Often the former is continuous operation and the latter is batch operation.

In my experience, this is a cyclical phenomenon. New managers seeking to be identified as agents of change often embrace and foster this reorganization of cleaning (and overall operations) from centralized (to achieve improved efficiency) to localized (to achieve better quality), or the reverse.

Over the last five or so years, the emphasis has been on the localized choice. Over the next decade, emphasis on cost control will probably reverse this change. I have seen it happen at least two or three times since the late 1980s.

SOME GOOD IDEAS
The development of localized parts washers ("cell washers") has brought some good—and long-needed—innovation to the marketplace for aqueous parts washers.

The unit in Figure 1 is but one example. Its cleaning cycle is highly compressed into a small volume as shown in Figure 2. This is a batch immersion machine, with one cycle of wash and (perhaps) rinse.

Another clever approach for a spray machine is that illustrated in Figures 3 and 4. This conveyor machine has a short range of movement. But with both machines, parts can apparently be washed and rinsed as often as desired—albeit with the same fluid.

SMALL FOOTPRINT
A desired characteristic of so-called "lean" machines is lesser requirements for floor space. This is done by extending machines in the vertical direction as much as possible. This is sensible, as floor space is much more expensive in a factory than is vertical clearance above the floor (see Fig. 5).

Another approach to limit floor space is to simply "force" all necessary components in a more compact enclosure, as is apparent in Figures 1, 6, and 7.

ENERGY REQUIREMENTS
A decade ago, a designer of parts washers would "bolt" a forced hot-air circulation system to the downstream end of a parts washer, and call it a dryer. This enhancement probably added the most to the operating cost of the parts washer because of high-cost of energy—especially electricity.

Today, lean means low(er) in purchase price and in operating cost. Users have properly evaluated if parts need to be dried, and if so how well. They have concluded many parts do not, and that many can be used directly after a blowoff with forced unheated air. It is evident that this evaluation can also save floor space.
WHAT ABOUT CLEANING QUALITY?
In one sense these “lean machines” are analogous to the “dishwasher” parts washers that replaced some inline parts washers used with printed wire boards (PWBs) during the 1990s. A decade or so later, the replacement was often reversed because dishwasher machines didn’t allow the degree of customization needed to achieve a consistent and high level of cleanliness with a variety of part shapes and soils.

Most parts washers called “lean,” including the aforementioned, have inherent limitations on quality. This is because they have only a single stage of cleaning and the rinse fluid is the same fluid in the wash tank.

SOME MACHINES AREN’T LEAN
Some firms do not provide “lean machines.” They live by and foster the viewpoints that: (1) the specific details of the application should dictate the nature of the parts washer used to complete it, and (2) good design (by them) can provide better value in a custom-designed machine by not trying to provide all features to all users, but by just providing the minimum necessary features.

In other words, “lean” to these suppliers means “buy just what you need, and no more.”

THE COST OF LEAN
There are two sides to every issue. Here are some to evaluate on an individual basis when parts washers for “lean manufacturing” are considered:
• The batch-mode single-cycle machine may not process a broad variety of part shapes and probably won’t manage a high soil level. This is probably the main drawback.
• To keep prices down, corners have been cut in some machines touted for lean manufacturing: though stainless steel can be an option, painted metal is often standard; forced air blowoff may be driven by a local air compressor and not by separately purchased turbine blower; solution tanks can be uninsulated and small; there can be no demister to allow exhaust inside plants; or there may be limited capability for automation or process control.

GREEN CAN BE KING
My industry, industrial cleaning, just won’t grow up! Some in it persist in telling the fable: “…Cleaning parts is a necessary task. But why scrub parts manually using nasty, unsafe solvents?” This claim is often accompanied by another to the effect that “lean manufacturing” is “green manufacturing” (whatever that is).

The choice regarding the degree of “greenest” is a choice that one makes when choosing the cleaning agent that will be used. While this is often related to the nature and amount of soil being removed, nearly all of the