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STRATEGY

by JOHN ZMIRAK

Productivity Blitz

Use the rapid-fire efficiency techniques that helped the RAF bring down Hitler's bombers

NO MATTER HOW YOU'RE DOING in your business, you could be doing it better. That's the message of Charles Holland, Ph.D., efficiency expert and statistics master. Holland learned much of what he knows from W. Edwards Deming, father of the Quality Improvement movement — and, some say, of the Japanese economic miracle. Holland is the founder and head of QualPro, a Knoxville, Tenn., consulting company.

Every business has at least one process that can be made better. Hidden inside the work of any company are wasteful or counterproductive procedures where making just a few small changes could ratchet up productivity and profit, according to Holland. Fail to do it, and that's money lost, between the gears and under the desks.

For finding and testing the best ideas about how to change processes, Holland offers a rigorous method, which he calls multi-variable testing (MVT). This increasingly popular discipline is helping companies from DuPont to the publisher of the *National Enquirer* squeeze out imperfections and maximize profit.

"In our experience of more than 10,000 experimental situations, only 25 percent of proposed 'improvements' do any good," Holland says. "A solid 53 percent have no effect — and 22 percent do harm. That's a narrow margin, isn't it?"

Most businessmen rely on hunches, history, and horse sense to decide how to improve their production or marketing. But that's just not good enough, according to Holland. "We can determine scientifically which changes are likely to help your business — often in a matter of weeks."

The key to getting started is finding solid performance measures that can test whether your "improvements" are actually working, such as sales revenue, customer-service complaints, spoilage rations, and so forth. Which figures are really critical to your business right now? Top-line sales growth? Throughput? Gross margin? These numbers must be relatively stable: wild fluctuations are a sign of crisis and render statistics meaningless.

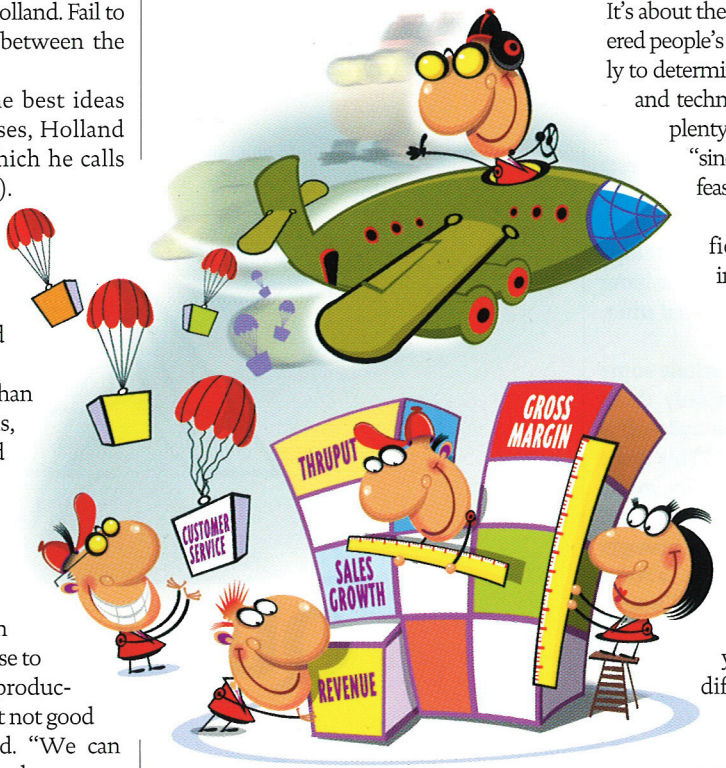
Once you have stable, concrete measurements, poll people from every level of your organization. "That means getting people involved, from the maintenance staff up to the engineers," said Dwight Glover, CEO of the Evans Clay Co., a McIntyre, Ga., processor of kaolin clay. Evans Clay used MVT in 1995 to increase its throughput by 30 percent without raising costs.

This involves more than a suggestion box. You must recruit employees from throughout the company and then ask them for detailed, practical suggestions on how to improve performance in the area you have deemed critical.

"This step alone was terrific for our business," says Iain Calder, executive vice president of American Media Inc., in Lantana, Fla., which publishes such tabloids as the *National Enquirer* and *Star* magazine. Calder is still engaged in MVT experiments, attempting to increase single-copy and subscription sales for the *Enquirer*: "People throughout our organization got excited; from top to bottom, they were being listened to. It boosted our morale."

But MVT is not just about feeling good.

Savings can come from the most unexpected places, say MVT experts.



It's about the bottom line. Once you've gathered people's suggestions, weigh them carefully to determine which ones are economically and technically workable. "It's best to get plenty of suggestions," Holland says, "since usually only a third of them are feasible."

Once you have narrowed the field, thank everyone for his input; then sit down to design experiments that test the feasible ideas. Now comes the tricky part.

"Let's say you wanted to test 11 suggestions — or variables, as we call them," says George Box, a professor of statistics at the University of Wisconsin who specializes in MVT. "To check each possible combination, you'd have to perform 2,000 different tests, over and over again — impossible." Such testing could literally take centuries, and you don't have that kind of time.

Neither did the Royal Air Force in 1943. That's where what we now call MVT originated, among mathematicians who reported straight to Churchill. Their task? To improve the antiaircraft shells that brought down

ILLUSTRATION BY WAYNE VINCENT

Hitler's bombers over London. Mathematicians Robin Placket and Peter Burman came up with a way to conduct only 12 different experiments in order to find the most likely combinations out of 2,000 suggestions. Their work yielded the RAF a better shell, one that took down more German bombers and saved British lives. The method worked.

Here's *how* it works.

Out of 11 suggested improvements (or variables), only two or three are likely to make a positive difference — and you can usually spot those factors during early, "screening" runs. They will be the factors that, no matter how you combine them, always seem to do some good. For instance, maybe different-color paper for your direct-mail letter seems to up responses — regardless of other factors.

Then you'd move that suggested improvement to the next, much narrower, round of testing. You'd also take two or three others — improvements that showed some impact in several tests, such as (for a mail piece) a special offer, a fancy new envelope, or a toll-free information number.

Only with this last round of candidates do you carefully test each permutation, to see which variables work best together. By now, you've reduced the number of tests needed to something manageable — to 12 to 16, instead of thousands (for instance, a yellow sales letter in a white envelope with no special offer versus the same letter in a pink envelope with no special offer, and so on).

The MVT procedure does exclude some possible combinations — but only those least likely to succeed. And the trade-off is worthwhile. Holland explains: "This is the way to find the most robust results, in the quickest manner. And it works."

Scott Gray agrees. As operations manager of agricultural products at DuPont's La Porte, Tex., plant, Gray has employed MVT testing on an ongoing basis since 1991, when he brought in QualPro to consult: "We've used MVT in every application you can imagine at a chemical plant — to improve chemical batches, the mailroom, our hospital, everything."

The results? "We can document savings of more than $38 million in costs and capital expenditures as a direct result of MVT," says Gray. "And we spent a total of only $600,000 on consulting and training to do it. I'll take that kind of payback anytime."

Savings came in the most unexpected places. Gray's plant was considering whether to buy a new centrifuge. "In the past, we probably would have just broken down and invested in the new equipment," he says. "But using MVT, we were able to test it side by side with our old machine — and decide it wasn't worthwhile. We spent $10,000 in testing to save $2 million."

Another part of the plant had quality problems with a line of herbicides sold in different grades and strengths. "This product line hadn't grown for 16 years," Gray notes. Using MVT, chemists were able to determine that the entire line of products was unnecessary — that DuPont could sell a single grade of the product and offer comparable results. The company did so, for an immediate cost and inventory savings of $6 million. The simplified, rejuvenated product was cheaper, could compete on cost, and could enter niche markets. "We've almost doubled the volume sold in only three years," says Gray, who adds, "We've never performed an MVT test that didn't yield the data for a significant improvement."

While MVT-style techniques have been used in industrial manufacturing since the first RAF results were published, in 1946, it is only recently that people have been applying them to marketing and sales, according to Box: "That was Holland's innovation."

Others have been quick to follow suit. Eric Almquist, a director at Mercer Management Consulting in Boston, shows businesses how to use a form of MVT for new applications. Mercer helps telecommunications and financial-service firms redesign their credit-card products and increase response rates. "There are hundreds of different possible attributes in a credit agreement. We help companies design experiments to discover which ones will be most attractive to consumers," he explains.

Which critical factor in your business could most use improvement? How would you measure it? At each level of your company, when could you ask about how to improve it? These are the questions to put to yourself and your staff. The ideas they provoke may locate the lost wealth hidden inside the cogs of your operation. S