

Lower heat treating costs with “PDQ” thinking!

By Robert W. Puls, Zion Industries Inc.

Heat Treat customers can get angry if they believe a supplier is providing lousy service. At that point, not many of these customers take comfort from the low price they got when placing the work.

Sometimes, before calling the supplier, customers call around to see if their complaint about poor service is fair. With heat treating, I’ve taken a few of those calls. Here are some typical customer issues:

“If the treater knows this is the problem, why can’t he get all the parts right?”

“The new shaft is very similar to the previous one-- only a few modifications. So, why’s the treater’s quote 25% higher per part?”

“The supplier said they’re having tooling problems and that they need four more days. How long does it take to fix a tool?”

There can be many reasons why heat treating suppliers might break their promises or miss expectations. Yet, there always seems to be a common set of factors involved...

PDQ: Price, Delivery, & Quality.

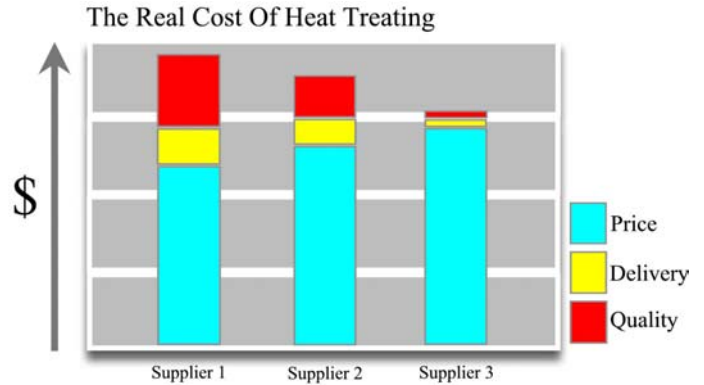
Usually the factors involve some sort of miscalculation about the total costs of the job. Miscalculations like these often occur when a supplier or customer focuses so much on the lowest price that they lose sight of other factors that remain essential to success.

The initials PDQ, for price (P), delivery (D) and quality (Q) remind us that every successful purchase requires a balance. While every supplier strives to offer a competitive price, each must also demonstrate the consistent ability to meet the turnaround times, delivery schedules, and inventory-cost targets your supply chain demands.

When a customer's supply chain gets longer, consistency in tracking and managing PDQ takes on greater urgency. No matter what is at the root of a supplier failure—people, knowledge, procedures, logistics, equipment—the impact can be costly. And, at the time of failure, there's little you can do except complain, and then look for help.

How do you prevent, or limit the risk of such problems in your supply chain? Many procurement groups use supplier qualification procedures, but these overall procedures may not rule out the kind of very specific problems that cause my phone to ring. A simpler, much

more practical method may be to look for suppliers who offer good track records and a demonstrated a strong balance of PDQ in their operations.



While these suppliers may not offer the lowest purchase price, they often have strengths, resources, and capabilities that will enable them to offer a lowest total job cost.

Here’s how that works: Every purchase cycle begins with a price quotation. Price quotes estimate the engineering, tooling, timing, handling, processing, quality assurance, and shipment arrangements required to receive, heat treat, and return quality parts to the customer. In each pricing quote there are a series of educated estimates as to the best methods for treatment, the timing and logistics of receiving and delivering the parts, and the capabilities of the people and processes, and equipment expected to complete the job. Only after winning the business, however, can the supplier really test their estimates against reality.

Beware! Quote Estimates Ahead

Should any initial quote estimate be proven wrong, a supplier may find himself squeezed by an inflexible price quote on one side and potentially costly or time-consuming customer assurances on the other.

To hold the line on price, the supplier may be forced to make compromises with potential consequences or costs later on.

Not all supplier problems are foreseeable of course, but there are a few that tend to come up most often:

- An unexpected “rush” on a job order due to delays in the customer supply chain or an acceleration of production rates. Either

circumstance may squeeze logistics timelines or supplier capacity long enough to cause problems.

- An unexpected need to modify or rebuild tooling, particularly if the tooling is sourced or serviced by a third-party supplier.
- Unanticipated, and unplanned time recalculating heat-treatment process inputs to get the required part characteristics.
- Changes in heat-treatment test methods, equipment, inspection methods or staffing needs to ensure outgoing part quality.

Here are a few things you can do to mitigate the risk of problems:

Depth of experience: choose a supplier with personnel that have the skills to handle all daily customer concerns, challenges, and demands.

Proximity: reducing the risk of extended transport times and costs while making daily communications easier.

Internal tooling design and manufacturing: suppliers with this capability can virtually eliminate the risk of job delays due to problems with tooling availability, adjustment, or repair.

Spare capacity: in facilities and equipment—to ensure continued service if primary facilities or equipment are damaged or unavailable.

In-house testing: helping to prevent quality problems through continuous testing, adjustment, and management of heat-treatment lines.

Track record: proof of serving and supporting customer supply chains with timely deliveries and high-quality, heat-treated parts.

How PDQ interacts with “total cost”

To illustrate how the P, D, and Q factors interact to affect costs, consider how three competing suppliers might quote the following job, and then, using the PDQ method, how a purchasing manager might evaluate the total costs of each quote.

Lets assume the following about the part:

- Annual quantity of parts to be treated: 12,000
- Cost of producing part prior to treatment: \$10
- Weight of each part: 1 lb.

Now lets look at each component of “PDQ” in turn:

Price. With the help of a well-defined treatment specification, our three competing suppliers are likely to submit initial per-part pricing quotes within a narrow range, as shown in Table A:

| | Supplier 1 | Supplier 2 | Supplier 3 |
|-------------------------------|------------|------------|------------|
| Heat treatment: Price/Part | \$1.00 | \$1.10 | \$1.20 |

TABLE A: The Initial Price Quote.

Delivery. Here we consider the time and logistical factors that can affect the total costs of delivery, which include:

- Proximity of the heat-treatment supplier to buyer (roundtrip)
- Part and shipment weight
- Frequency of shipments
- Relationship with the shipping company re: pricing and discount schedules

For simplicity’s sake, assume that all of the parts are shipped to and from each supplier with the same frequency, 1 shipment per month, with each shipment containing 1,000 parts. Further, let’s assume that shipping costs equal \$1 per 1,000 pounds, per mile. This leaves distance and missed delivery dates as the only variables. As shown in Table B, the supplier locations range from 50 to 200 miles away (roundtrip): this adds up to annual shipping costs of \$600 to the nearest supplier and \$2,400 to the farthest.

| | Supplier 1 | Supplier 2 | Supplier 3 |
|--|------------|------------|------------|
| Distance (Miles) | 200 | 150 | 50 |
| Total Ship Cost (Rate x Miles x Weight) | \$2,400 | \$1,800 | \$600 |
| Total Transit Time (days) | 4 | 3 | 1 |
| Job Turn Time (days) | 15 | 10 | 3 |
| % of On-time Delivery | 80% | 90% | 95% |
| Total Carrying Cost | \$510 | \$362 | \$113 |

TABLE B: Cost of Delivery

Carrying Cost

This calculation quantifies the \$ value equal to: “Shipped Parts” x “Value of Parts” x “Daily Rate” (5%/365) x “Days (ship + turn)” x “# of Shipments”.

In addition to the annual shipping costs, total delivery cost in Table B also includes the carrying cost of the inventory being shipped around, and the associated time in missed delivery dates which in this table are reflected as the “% of On-time delivery”. In our case, the annual carrying cost is calculated at a rate of 5% per annum.

In this example, the per-day carrying cost equals \$1.37, multiplied by the days of turnaround time. In turn, each supply has had added their particular "On-time" deliver factor. For Supplier 1, total delivery cost is about 24.2 cents per part, compared to a comparable 0.059 cents per part for Supplier 3. This example shows that proximity to the supplier and smooth, fast-turning, supplier operations can counterbalance lower treatment pricing and therefore reduce total job costs.

Missed delivery dates are, by nature, a domino factor. In their own right they may only have a marginal effect on cost. Stack them against the risks associated with stopped production, or missed customer deadlines, and their cost skyrockets. As each specific situation differs widely, in this analysis, we will confine the area of cost to those associated with carrying inventory.

Quality. The final factor in PDQ is quality, which we will measure as the number and value of manufactured parts found to be defective following heat treating. In addition to the lost value of the scrapped parts, additional quality-related, costs not considered here, may include defect analysis, corrective measures, or increased inspection requirements—or in the worst possible case the cost of recalled parts that are already in use.

| | Supplier 1 | Supplier 2 | Supplier 3 |
|---|------------|------------|------------|
| Total parts found defective after treatment | 500 | 300 | 50 |
| Total Cost of Defects | \$5,000 | \$3,000 | \$500 |

TABLE C: Cost of Quality

Considering all the PDQ factors.

After considering all of the PDQ factors in the purchase, from the initial quoted price through the costs of delivery and quality, the procurement manager would likely choose Supplier 3 at the PDQ price of \$15,613.00. Although this supplier quoted the highest initial price for heat-treatment, its proximity to the customer location, its internal process speed and turnaround time, as well as its superior quality make the cost of doing business with them dramatically lower than the others.

By inserting and calculating your own numbers, you can use this tool to evaluate your heat treat purchasing activities.

Slipping Delivery: It's a sign—use it!

It has been my experience, from the "other suppliers" business we have picked up, that there is a progressive "slide" that customers should notice.

The early signs of this slide are usually indicated by the supplier's need to renegotiated delivery dates—or they just start blatantly missing them. A supplier's need for more time, especially if you supplied the parts as requested, is a key element to watch for. Next time your supplier shifts delivery dates, dig a little, you may be surprised by what you find out.

Every Businesses Goal

As every business strives to make its dollars go further, I hope that the concept of total cost, based on PDQ thinking, will pay dividends to you, your company, and your customers. If you have questions about how this calculator can work for you, please let us know.

For an online version of the calculator that you can experiment with, please visit our website at www.zioninduction.com.

| | Vendor 1 | Vendor 2 | Vendor 3 |
|-------------------------------|----------|----------|----------|
| Annual number of parts | 12000 | 12000 | 12000 |
| Part weight (lb.) | 1 | 1 | 1 |
| Heat treatment, per part | \$1.00 | \$1.10 | \$1.20 |
| Price [Sub-Total] | \$12,000 | \$13,200 | \$14,400 |
| Distance (roundtrip mi.) | 200 | 150 | 50 |
| Lb. / mi. shipping cost | \$1 | \$1 | \$1 |
| Shipments per year | 12 | 12 | 12 |
| Total Shipping Cost | \$2,400 | \$1,800 | \$600 |
| Total Transit Time (days) | 4 | 3 | 1 |
| Job Turn Time (days) | 15 | 10 | 3 |
| % of On-time Delivery | 80% | 90% | 95% |
| Total Carrying Cost | \$510 | \$362 | \$113 |
| Delivery [Sub-Total] | \$2,910 | \$2,162 | \$713 |
| Part cost before treatment | 10 | 10 | 10 |
| Total of original # defective | 500 | 300 | 50 |
| Quality [Sub-Total] | \$5,000 | \$3,000 | \$500 |
| PDQ Total Cost | \$19,910 | \$18,362 | \$15,613 |

TABLE D: Summary of PDQ Analysis



INDUSTRIES, INC. *Precision Induction Heat Treating.*

Since 1977, Zion Industries has been a leader in the induction heat treating business, providing both high quality heat treating services and handling equipment. They have established facilities in Ohio, Michigan, and North Carolina.

Call, or visit Zion Industries Inc. online, to see if they are a group that can benefit your business.

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