

Nuts & Bolts

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Making Money: Is that Really Necessary?

Remember in Eli Goldratt's book, *The Goal*, Alex, a manufacturing plant manager, runs into an old contact, Jonah, at the airport. They briefly discuss business. As Jonah is about to board the plane, he says to Alex, "Come on, Alex! Quickly! Tell me the real goal (of your manufacturing organization), if you know what it is." Jonah leaves with Alex perplexed. After a few attempts, he still couldn't find the right answer. Later he realizes, the goal is to make money!

Often manufacturers must juggle the demands of maintaining product performance and high quality while reducing costs and increasing profitability. Review of the raw material selection and inspection process may introduce avenues for savings. Consider the following items.

Chemical Composition:

1. Does the material/alloy meet our design requirements?
2. Could we restrict or expand the range of chemical composition to meet the design requirements, and reduce scrap by improving material work-ability (forming, machining & welding)? (See "Applied Chemistry," page 3)
3. Could a change in our specification reduce our cost of quality, by reducing corrosion or wear failures?
4. Are the materials we receive certified to our specifications? Does our method of certifying materials comply with our quality manual? Are we sure we are getting what we expect?
5. Do our materials continue to meet design specifications after secondary treatments and conditioning has been performed?
6. Would routine sample testing of incoming materials reduce the costs of manufacturing downtime, customer dissatisfaction and returns?

Inside:

- ◆ Applied Chemistry
- ◆ In Real Life
- ◆ Light Reading
- ◆ Failure Analysis Road Map
- ◆ Get EASTEC '97 Show Info!

(Continued on page 2)

*“Make that
call NOW:
Solve the
problem
before it
festers.”*

—Tom Peters
The Pursuit of WOW!

**Need a
Little Light
Reading?**

Material Form & Size:

1. Would forging, casting or powder metallurgy serve our needs better?
2. Have we specified dimensions or tolerances that are custom for our supplier? Can we save money by working with their standards?

Conditioning & Surface Finishing:

1. Can we eliminate any secondary conditioning or tempering processes by ordering them directly from the supplier?
2. Can we order our final surface finish from the supplier? If not, is the finish currently supplied compatible for our final finishing steps?
3. Can we reduce cosmetic and performance defects by changing the conditioning or surface treatments of the materials supplied?

Descriptions:

1. Have we specified our materials with the right language so not to imply a more “expensive” form?
2. Have we used the correct descriptions to ensure we will get what we want?

Understanding Defects & Failures:

1. Are we making the most of our defects and failures? Are we learning from our mistakes?
2. Can we improve our processes by understanding the root cause of material and part failures?

There are other ways you may save money in your material selections. Please feel free to call us to explore your options. We've been serving the material evaluation needs for manufacturers for over 30 years. We're confident we can help. Call 800-334-5432

The Goal, A Process of Ongoing Improvement, by Eliyahu M. Goldratt & Jeff Cox, North River Press, Inc. 1992. This easy to read novel, explores the world of manufacturing through the eyes of the plant manager. If you've ever wondered what your boss was thinking, this may help. Even if you know what your boss is thinking, it's an easy weekend read!

Did you see us in the March issue of the *Fabricator* magazine? NH Materials Laboratory's own Tim Kenney is one of the featured authors, writing about ***Visual Inspection of Welds***. If you haven't seen it and would like a copy of the article, just give us a call. 800-334-5432



Applied Chemistry: Metals

Did you know that the carbon content in steel has a significant impact on the performance of the material in many applications? If the carbon content is increased, this is what happens...

- *The melting point of the steel is lowered.*
- *The steel becomes harder.*
- *The steel has higher tensile strength.*
- *The steel is less ductile.*
- *The steel becomes more wear resistant.*
- *The steel becomes harder to machine.*
- *The steel is more difficult to weld without cracking.*
- *The steel becomes heat-treatable.*
- *The steel may become more expensive because of lower volumes of production.*

When having your materials analyzed, determine if your laboratory or supplier does a surface analysis or a bulk material analysis.

Sometimes the surface analysis of a material can be misleading. This is especially true in free machining grades of steel, stainless steel or brass. In these grades other elements (i.e.: lead, sulfur or phosphorus) have been added to make machining easier.

These additives may not be evenly distributed in the metal due to chemical segregation. A surface analysis may inaccurately report the chemistry of the material due to a concentration of additive at the test point.

A bulk analysis, where drillings of metal from throughout the sample are tested, can provide more precise information regarding the true chemistry of the material.

Talk to your materials expert, or call us, we'll be glad to explore how material chemistry testing can help you. 800-334-5432.



In Real Life: Watch Your Triple Lutz!

A supplier of sporting good equipment recently sent us two ice skate blades. One blade was from a pair of figure skates they currently sell. The other was from a new supplier whom they were considering.

Here's what we found...

Upon chemical and metallographic analysis we found that the proposed skate had thinner chromium plating than the existing skate. This difference could cause the "pick" of the new skate to wear and rust faster than the existing one.

We found a lack of copper underplate on the proposed blade. Although performance changes would not be expected, this missing copper may reduce the adhesion of the chrome coating and cause the blade to look dull.

We also found that the existing blade was induction hardened throughout much of the blade, while the new skate was case hardened in a more narrow region. After repeated sharpening, one could wear through the hardened portion of the bottom of the proposed skate.

Remember, these types of analyses can be a part of any product review including a failure analysis, competitive analysis or new product review, like this one.

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manufacturing material & engineering problems.



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