

# CRAFTSMAN'S CRIBSHEET

 NUMBER  
**45**

 Miles Free – Director of Technology and Industry Research  
  Technical  
  Regulatory  
  Quality  
  Management

## Orders of Magnitude: Key to Process Problem Solving

If you have an intermittent or periodic problem, start counting frequency of occurrence, and then figure out what the order of magnitude is compared with your process.

The order of magnitude reflects the relative scale of our processes and helps us see what is and is not applicable to the problem at hand.

To solve periodic or intermittent problems in our shops, the first step after identifying the problem is collecting data about “when” and “how often” it occurs. Then, compare it with the orders of magnitude that occur naturally in your shop that can help you narrow down the likely causes.

Relative frequency can be a big help when you figure out that the frequency has some relationship or equivalence to some aspect of your process. If the frequency is about equal to two occurrences per bar, then it becomes relevant to look at bar ends first. With two ends per bar, or the fact that you might get only two parts out of the first bar end, this tying of frequency to an order of magnitude denominator saves a lot of thrashing about to try to identify root cause.



*Occurrence could be per bar end, per bar, per stock-up or per heat.*

Here are some orders of magnitude that exist in your shop.

### Material Order of Magnitude

- Per piece
- Per bar
- Per bundle
- Per lot
- Per order
- Per heat
- Per supplier

### Machining Operation Order of Magnitude

- Per spindle
- Per stock-up
- Per machine
- Per shift
- Per release
- Per batch
- Per lot
- Per production order

All Craftsman's Cribsheets are available for viewing and download at [short.productionmachining.com/cribsheets](http://short.productionmachining.com/cribsheets).