



# A Case for CIM

Why Computer Integrated Manufacturing is  
Critical for your Operations

# Who Should Care?

(can I leave now?)

**Business Owners**



**People who work for  
Business Owners**





# Goals and Assumptions

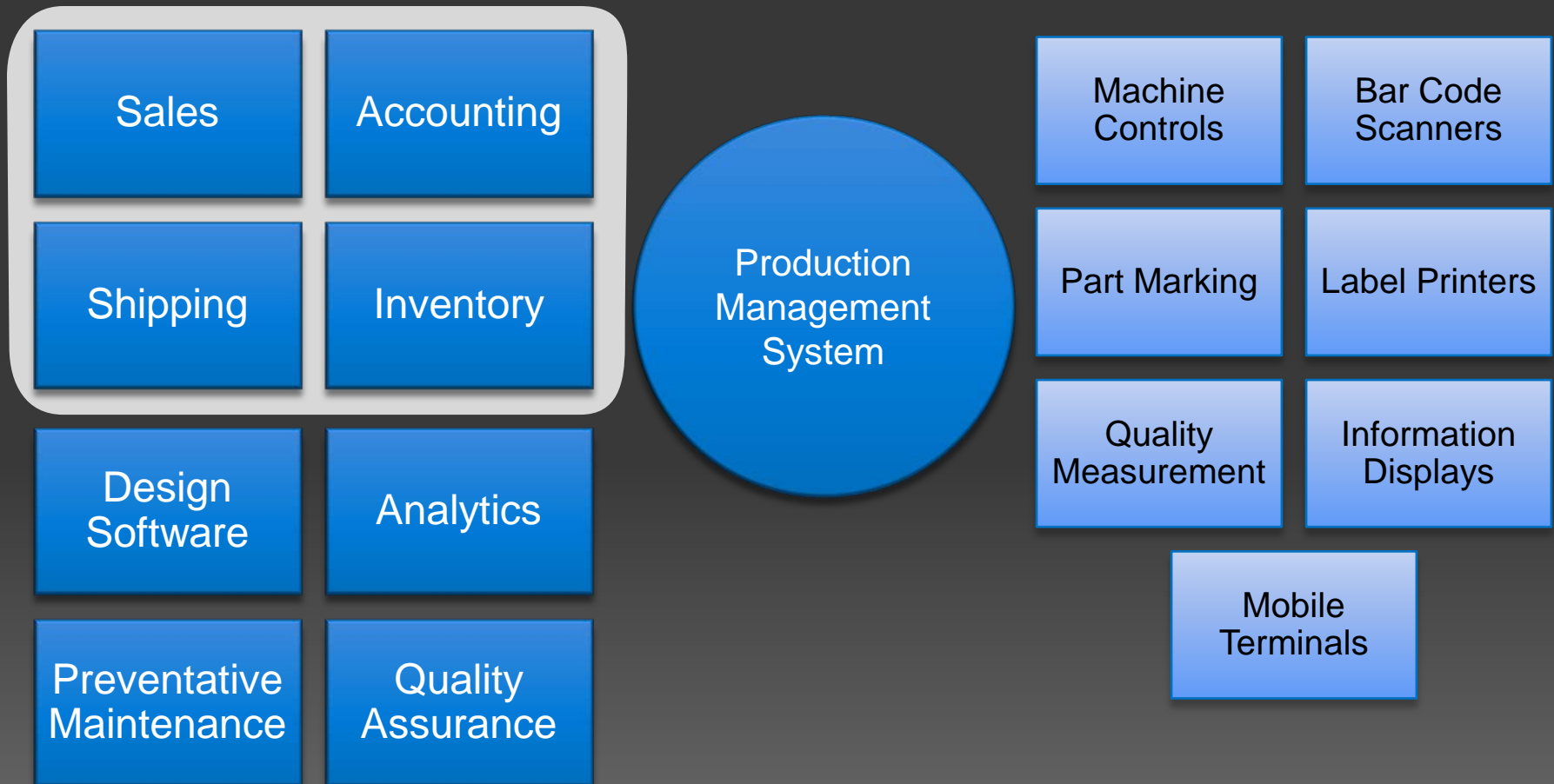
## Goals:

- Understand what an integrated manufacturing system does
- Understand how it changes daily operations
- Understand the financial and competitive impact

## Assumptions:

- Roll forming is a big part of your operations
- Your roll forming machines produce finished products
- Make to order

# What is CIM?





# What is CIM good for?

- Mistake-proofing
- On-time deliveries
- Perfect accounting & inventory control
- Eliminating waste/growing capacity
- Flexibility
- Management focus and capital spending
- Continuous improvement

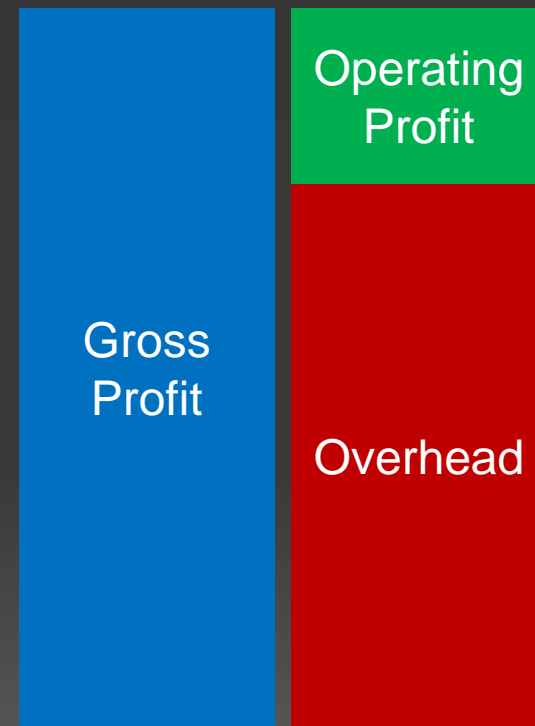
# Step 3: Profit!



**Goal: profit now  
and in the future**

Simple model:

**Gross Profit**  
**- Overhead**  
**Operating Profit**



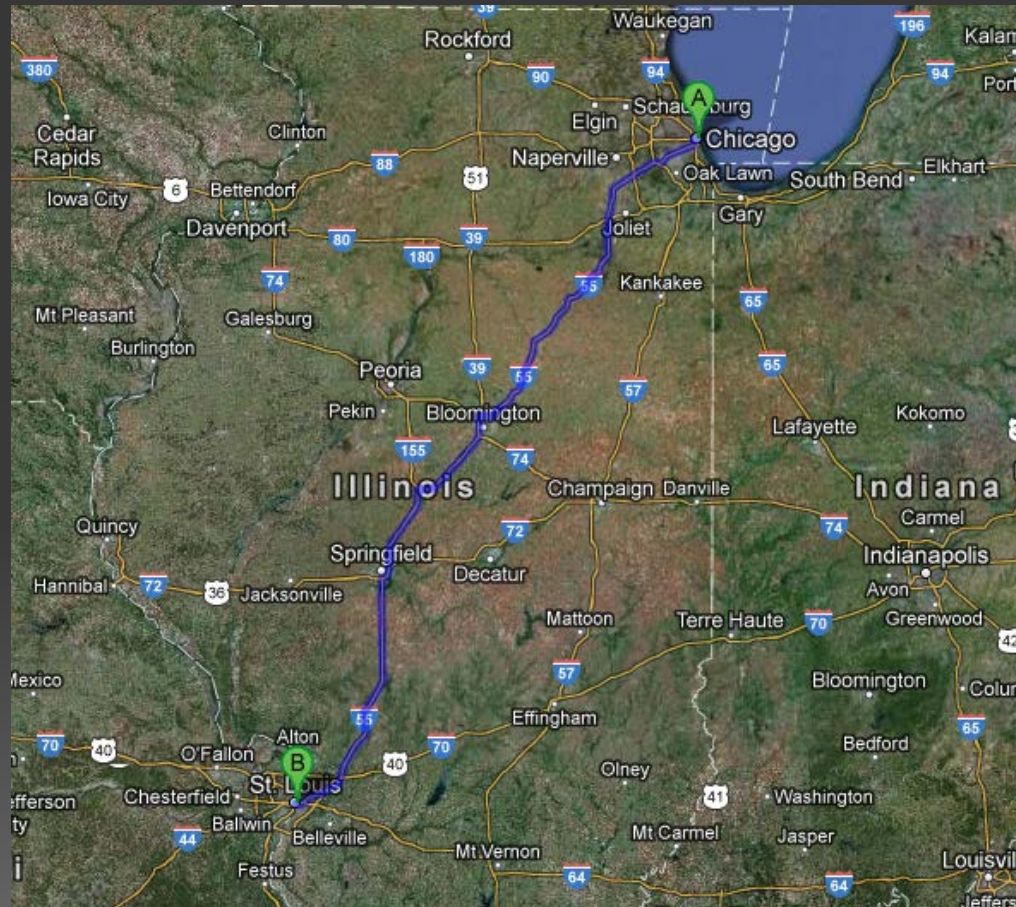
# Gross Profit

Gross profit = selling price – material cost



# Speed vs. Throughput

Road trip: Chicago to St. Louis = 300 miles





# Speed vs. Throughput

Road trip: Chicago to St. Louis = 300 miles



**Good news:**  
Bugatti Veyron

Speed = 265 mph  
Trip time = 67 minutes!  
Throughput = 265 mph



**Bad news:**  
Potty-training toddler

Must stop every 45 mi.  
Each stop = 20 min.  
Trip time = 187 min.  
Throughput = 96 mph



**More bad news:**  
Antique-obsessed  
mother-in-law

Must stop at every flea  
market @ 60 min. ea.  
Trip time = 307 minutes  
Throughput = 58 mph

# Machine Speed vs. Throughput

Back to Roll Forming...



# Machine Speed vs. Throughput

Back to Roll Forming...



**Good news:**

Flying shear

Speed = 135 fpm

**Throughput = 135 fpm**



**Bad news:**

20 Coil changes/shift

12 minutes/change

240 minutes downtime

**Throughput = 58 fpm**



**More bad news:**

2 Tooling changes/shift

35 minutes/change

310 minutes downtime

**Throughput = 35 fpm**

# How Roll Formers Make Money

Production / day =  
 $(420-310) * 135 = 14,850'$

Gross profit / year =  
 $14,850 * \$0.50 * 250 = \$1.9M$

Overhead / year = \$800K

Operating profit = \$1.1M\*



Gross  
Profit  
\$1.9M

Operating  
Profit  
\$1.1M

Overhead  
\$800K

*\* Assuming you can sell all production*

# How Roll Formers Make Money

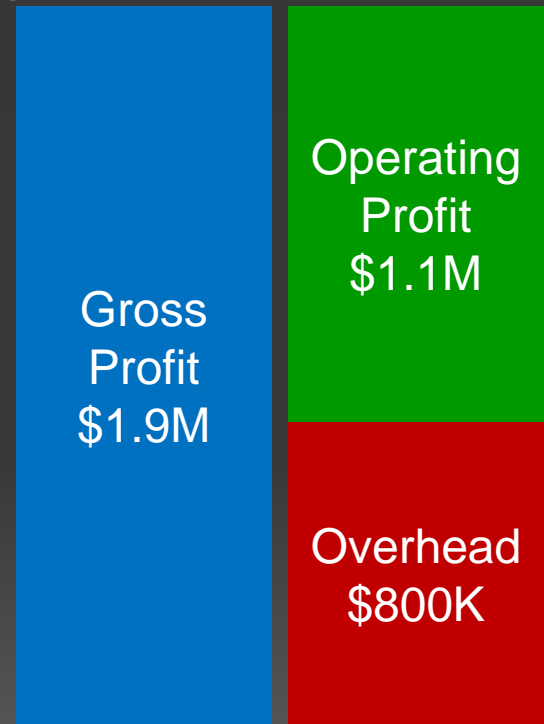
*Almost...*

Additional downtime from data entry, etc: 35 min.

Production / day =  
 $(420 - 310 - 35) * 135 = 10,125'$

Gross profit / year =  
 $10,125 * \$0.50 * 250 = \$1.3M$

Operating profit = \$466K\*



\* Assuming you can sell all production

# How Roll Formers Make Money

*Not so fast...*

Problems with stacker limit speed to 120 fpm

Production / day =

$$(420-345) * 120 = 9,000'$$

Gross profit / year =

$$9,000 * \$0.50 * 250 = \$1.1M$$

Operating profit = \$325K\*



\* Assuming you can sell all production



# How Roll Formers Make Money

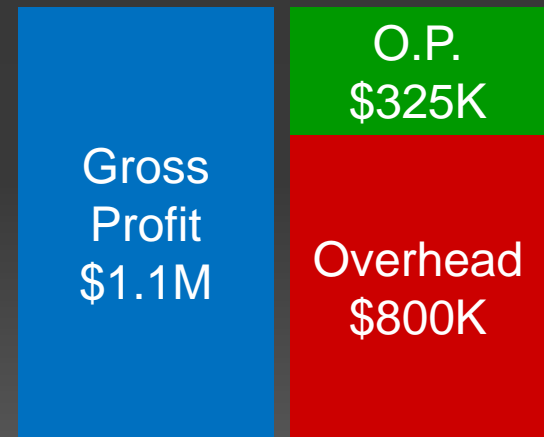
*Oh, Scrap!*

2% of parts have a problem and you scrap  
10' per coil change

Production/day =  $(420-345) * 120 * 98\%$   
= 8,820'

Gross profit/year =  
 $8,820 * \$0.50 * 250 - (180+200) * \$2.00 = \$914K$

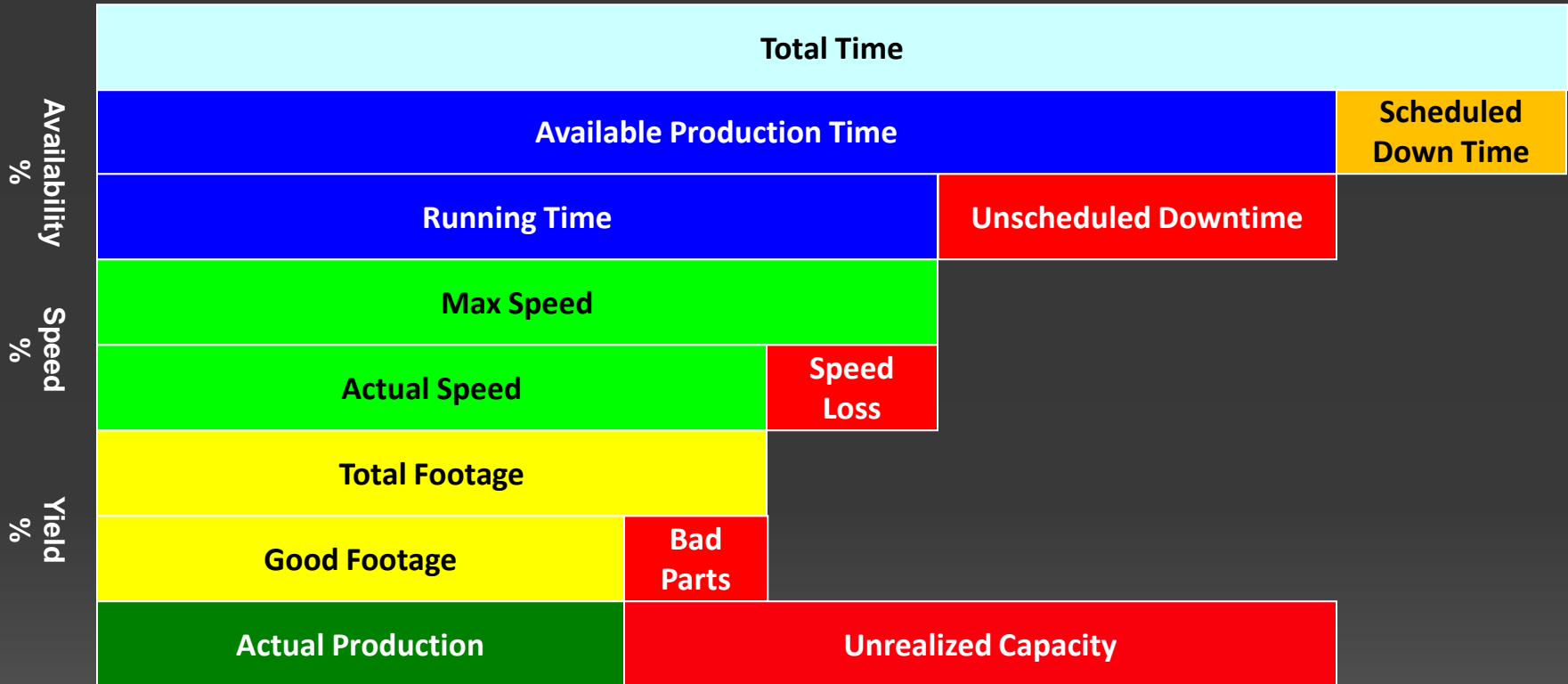
Operating profit = \$114K\*\*



*\* Assuming you can sell all production*

***\* Assuming you don't ship any bad product to a customer!***

# OEE – Overall Equipment Effectiveness

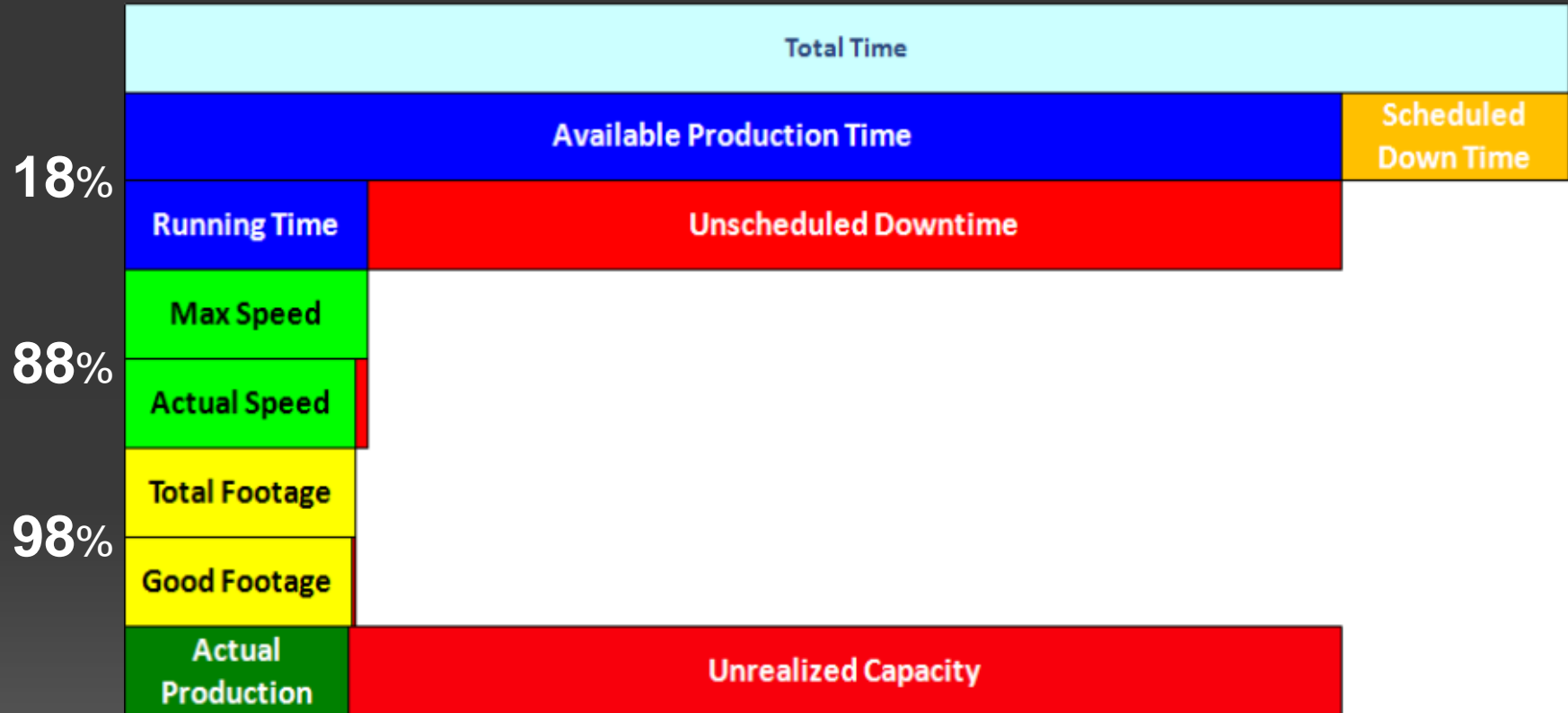


$$\text{OEE} = \text{Availability} * \text{Speed} * \text{Yield}$$

$$= \text{Good Production} / (\text{Available Production Time} * \text{Max speed})$$



# OEE – Overall Equipment Effectiveness



$$\text{OEE} = 18\% * 88\% * 98\% = 15.6\%$$



# Mistakes Happen!

- Data entry
  - 20 orders, 10 items each per day = 400 entries/day.
  - At 0.01% error rate, average 1 error every 25 days.
  - Trained data entry staff have 0.2-0.8% error rates (errors every 1.25 days or worse)
- Wrong coil
- Wrong truck
- Wrong punch pattern or profile

# How Does CIM Help?

## Mistake-proofing

- No more data entry errors
- Coil validation prevents incorrect material usage
- Automation can be used to ensure correct tooling is loaded
- Bar codes prevent data entry mistakes throughout the process

# How Does CIM Help?

## On-time deliveries

- Predict completions
- Smarter scheduling
- No “local optimization” by operator
- Fewer “fires” caused by mistakes
- Instantly detect material shortages

# How Does CIM Help?

## Perfect accounting & inventory control

- Exact coil inventories
  - Usage totals accurate to a fraction of an inch
  - No data logging errors if using bar-codes and coil ID validation
- Exact finished goods tracking
  - Know exactly what was produced in each bundle
  - Great tool for dealing with customer complaints
  - Traceability: what coil was used to produce each part

# How Does CIM Help?

## Less Waste/More Capacity

- Eliminate downtime
  - Data entry
  - Coil and production logging
  - Waiting for coils to arrive or finished goods to be removed
  - Coordinate help to minimize changeover time
- Minimize scrap
  - Optimize production schedule
  - Optimize cutting patterns for slitters or shears
  - Mistake-proofing!
  - Knowing causes leads to fixes

# How Does CIM Help?

## Flexibility

- Schedule
- Bundling
- Custom punching or profiles
- Bundle labeling and part marking



## How Does CIM Help?

# Management focus and capital spending

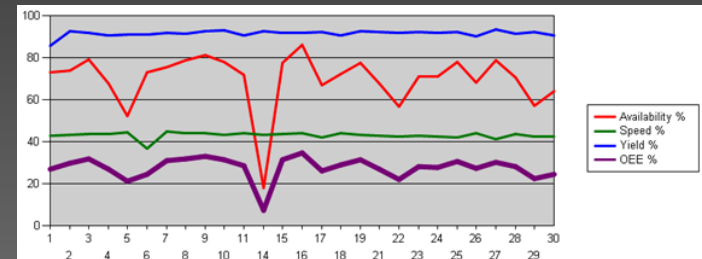
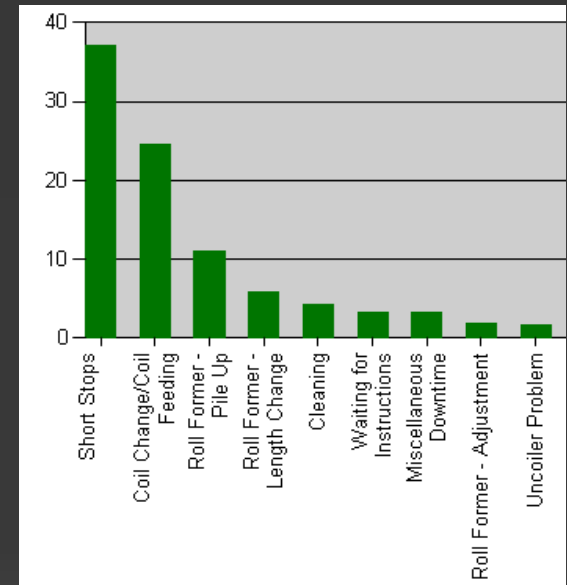
- Operator performance
- Supplier performance
- Equipment performance



# How Does CIM Help?

## Continuous Improvement

- Use Pareto charts to focus attention
- Correlate performance
- Use OEE and other metrics to monitor results & progress



# Let's Make More Money!

## After implementing CIM...

1. No more data entry downtime
2. Fewer customer complaints & “yield loss”
3. Dialog with operators gets the stacker fixed
4. Smart capital spending on coil handling
5. OEE improves from 15.6% to 36%
6. Operating profit increase from \$114K to \$1.5M

Gross Profit  
\$2.26M

Operating Profit  
\$1.5M

Overhead  
\$750K



# Observations

- Operational excellence can be a competitive advantage.
- CIM is a tool that was “designed” to improve profit & ensure happy customers
- CIM = Good Results
- CIM + Good Managers = Great Results

# Questions?

