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# QUARRY ACADEMY

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Improving Processes. Instilling Expertise.

**DYNO**  
Dyno Nobel



# Not All Parts are Created Equally

CH Hillmann



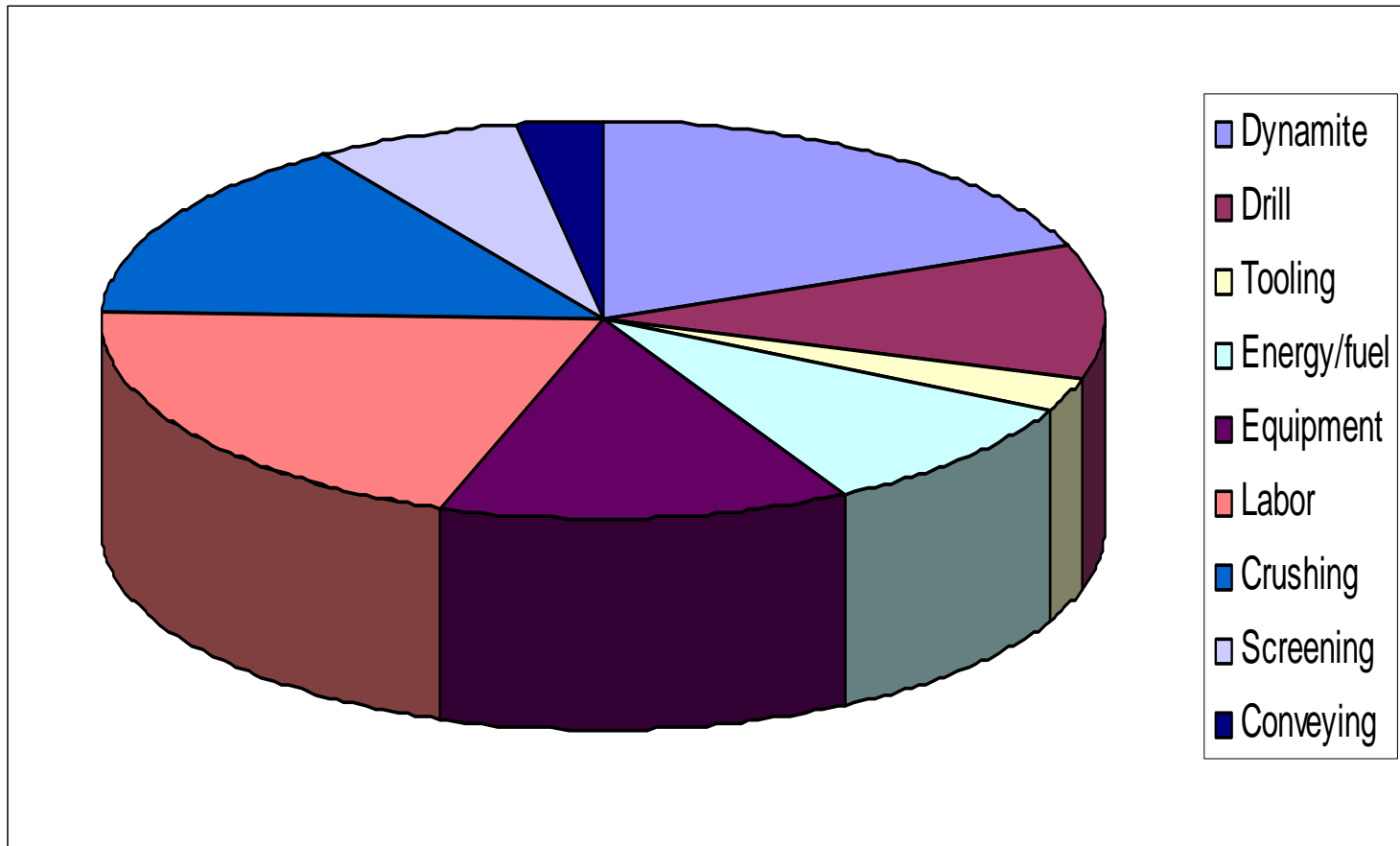
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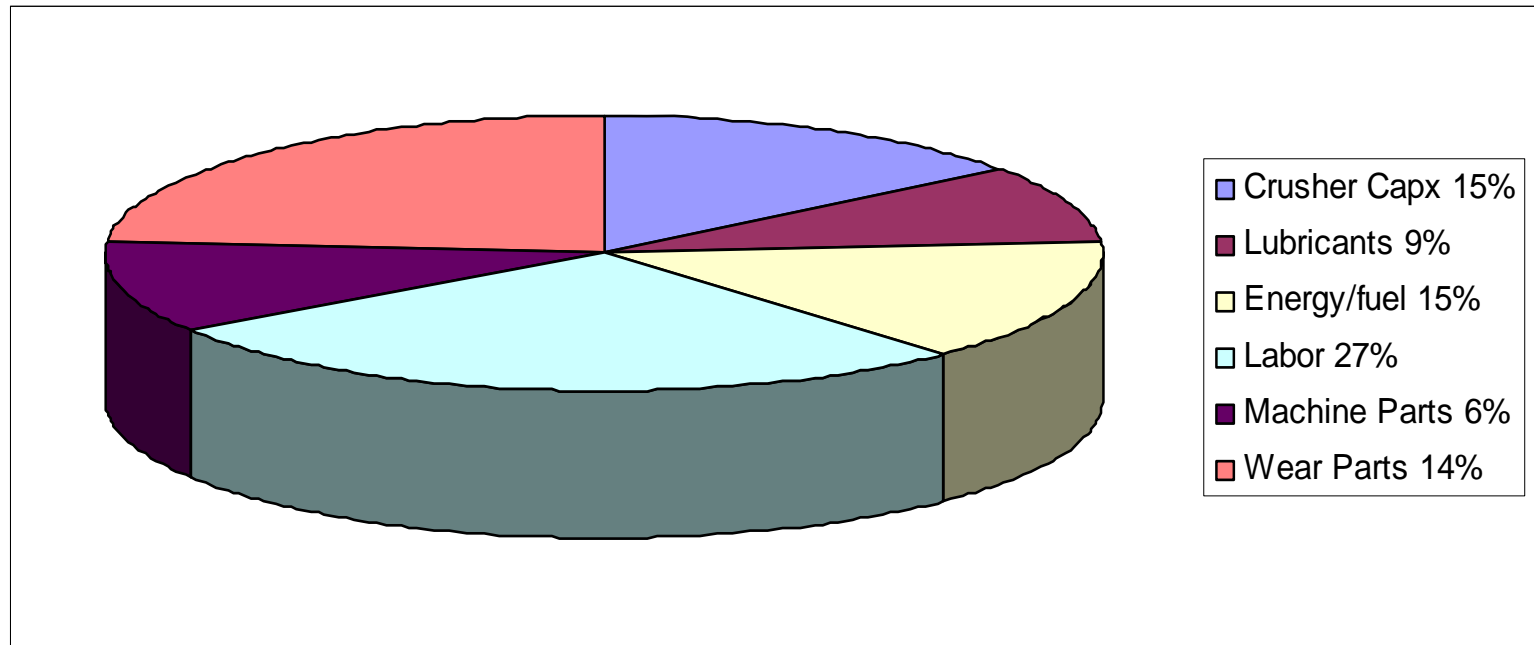


# Actual Crushing Costs are only a “FRACTION of REAL COSTS”

Crushing makes Up 15-20% of Production of Aggregate



# WEARS & SPARES Costs are only a “FRACTION of REAL COSTS”



Even if your Liner cost is lowered by 30% it is only 4% of your Crushing Costs and **less than 1%** of Your Real Total Costs !

# Things to think about

- **Why would large reputable OEM develop inferior parts ?**
- **Whom would have the greatest Knowledge of the forces, angles, stress loads and industry then the OEM ?**
- **If you had the opportunity to buy a Goodyear Tire or a GOTYAH Tire for 30% less with the same pattern would you do it !**
- **If your Company sells Consumable Steel then extra steel sales means everything & long lasting steel is not a good option !**
- **If you save 20 % of your Wears & Spares Costs in exchange for 2% in production or availability is it worth it ?**

# Profitability Impacts

Profit Impact Is considerably Higher

**EXTRA DAY PRODUCTION = 1.5% EXTRA PROFIT**

**1 % EXTRA PROCESS AVAILABILITY = 4.0% EXTRA PROFIT**

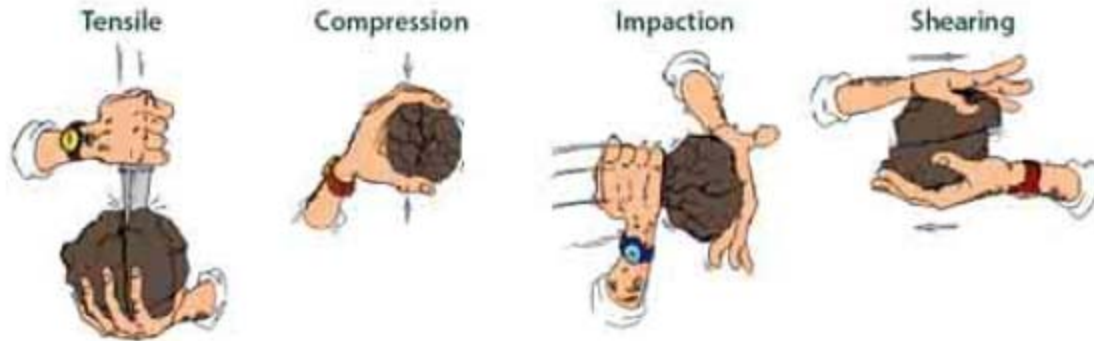
**1 % EXTRA PROCESS CAPACITY = 4.5% EXTRA PROFIT**

**1 % EXTRA END PRODUCT YIELD = 5.2% EXTRA PROFIT**

**20% SAVINGS IN PARTS EXPENDITURES = 0.9% EXTRA PROFIT**

**PROCESS IMPROVEMENT= 200-400% MORE PROFIT**

# Wear & Wear Parts



## METALS

MANGANESE STEEL  
Ni HARD  
Ni-Cr WHITE IRON  
HIGH CHROME  
Cr WHITE IRON  
CARBIDE



## POLYMERS

RUBBER  
POLYURETHANE  
RUBBER/CERAMIC  
CERAMIC

# Productivity and Quality

## ● ALL Market leaders "ARE" LEADERS in Quality

- ✓ Quality improvement of end products through the wide range of crushing chambers
- ✓ Multiple samples of the alloy is taken during manufacturing and stored for future reference.
- ✓ Test plant and test Sites
- ✓ Ridged R&D programs
- ✓ High R&D budgets
- ✓ The heat treatment process is controlled through computers.
- ✓ Machining is carried out in CNC machines.
- ✓ Fixtures, gauges and tools are manufactured centrally.
- ✓ Control of the entire manufacturing process
- ✓ Warrantee control process
- ✓ ISO process
  - Moulding
  - Casting
  - Machining

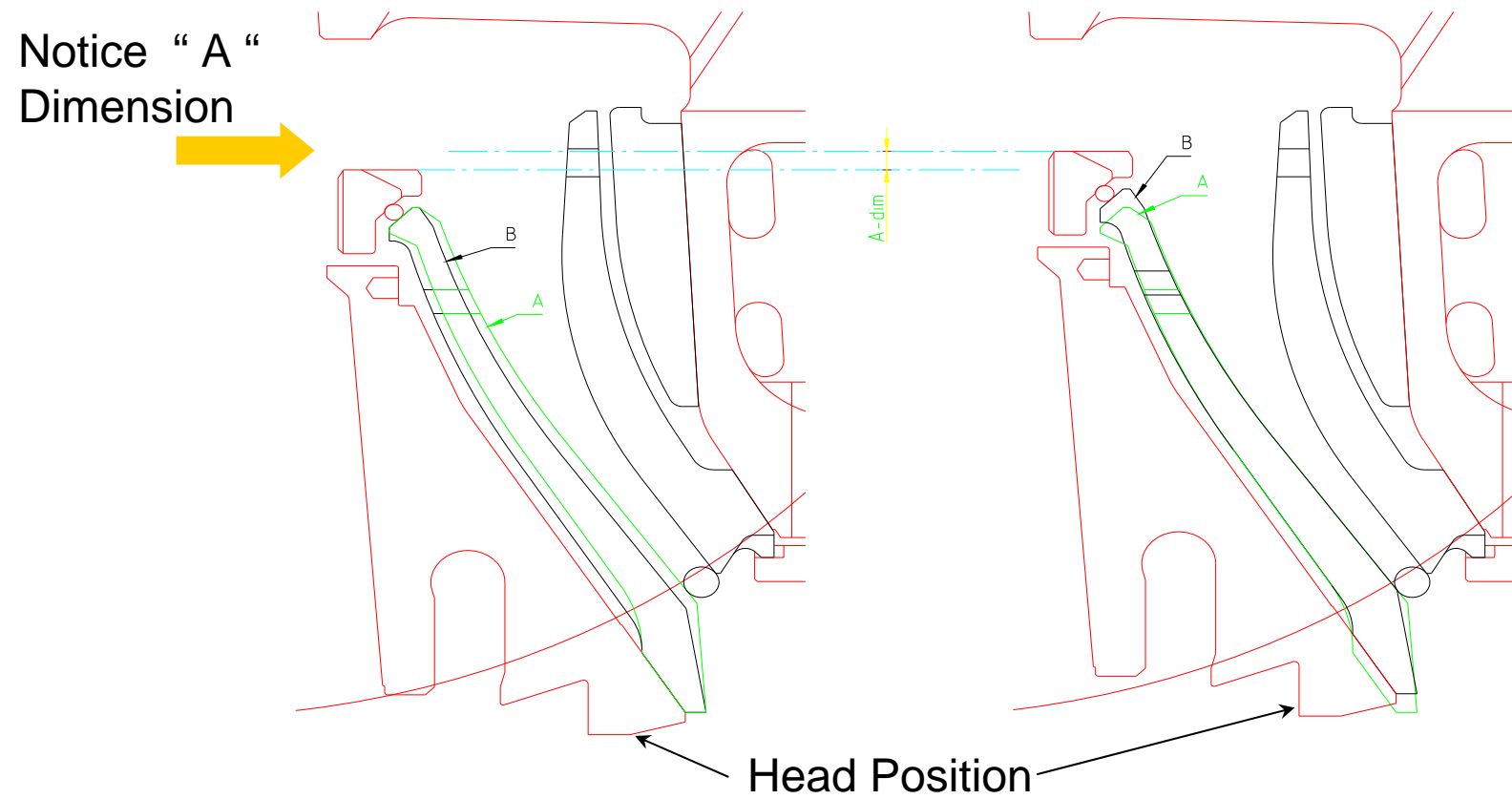




# Examples Of Quality Parts

- **Filters , Seal , Can , Paper Type , Paper Area & Safety**
- **Shafts, Material Type , Heat Treatment , Precisions**
- **Bearings, Race , Material Type , Surface Grind & finish**
- **Manganese , Machined Surface , Heat Treatment , Metallurgy**
- **Belting Jackets , Cord Type , Rubber Type**
- **Idlers Seals , Can , Bearings, Support Frame**
- **Pulleys, Shafts & taper Systems, Can & Shaft**
- **Paints, primers Surface Prep & Finishes**
- **Media Wire Type ( material ) , Process Weave & Hook folds**
- **Bushings Metallurgy & precision**

# Chambers “ A “ Mantles Versus “ B” Mantles



The exact Situation occurs when a Thicker Concave and Mantle is used !

# Problems Associated With Chambers , Which Involve added material rather than “Designed Performance”

Smaller Opening  
“forces Crush Material  
higher in Chamber” P80  
Factor

If The Mantle &  
Concave Is thicker  
Loose Feed opening

New Diameter

Original Diameter

H6800-MC/B  
Throw 48  
CSS 34

New Position of Material

If Mantle Is  
thicker The NIP  
angle is shallow

New Position Of Liner

# OEM's offer Plant Process Chambers not wear parts

We strongly urge you to carry out the following tests if you are using pirated manganese parts:

1. Random sieve tests on the materials discharged from the crusher during the 1st week after the liner change - capacity and product gradation.
2. Capacity tests on the materials returned to the prior screen - to determine the percentage of return.
3. Roundness of the mantle or concave.
4. Percentage of machining by the local foundries for fit and performance.

Machining  
on Original  
Mantle

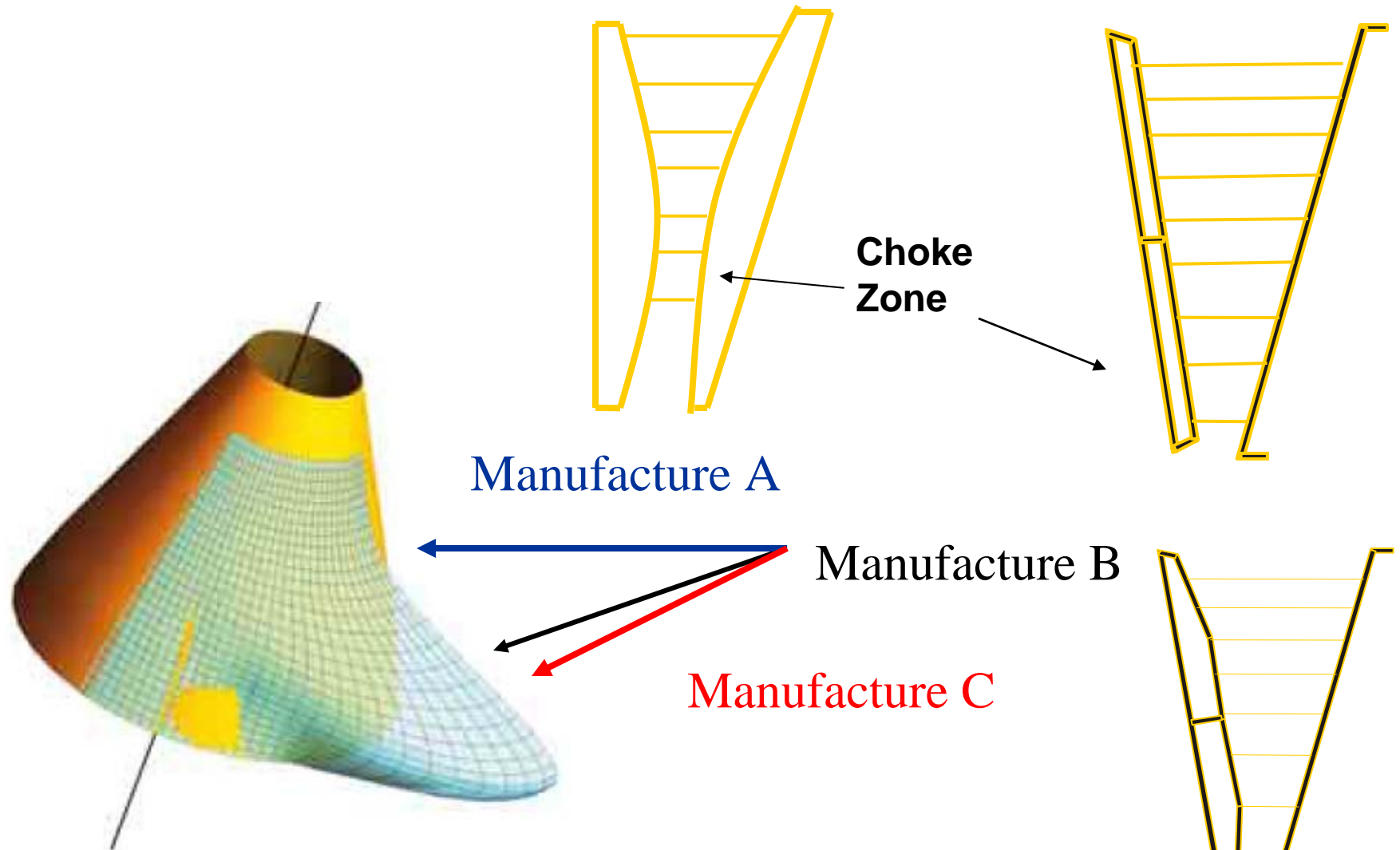


Vs



No machining  
on Pirated  
Mantle

# Forces vary by design



# What is the value of a part that fits?

- **Incorrect dimensions and ovality has caused:**
  - ✓ **Mantles and concaves to crack**
  - ✓ **Damage to bearings and bushings**
  - ✓ **Mainshaft failures**
  - ✓ **Cracked top shells**
  - ✓ **Damaged metal-to-metal contact surfaces.**



# We offer Process & Production chambers not wear parts



- **Neither profile is correct! Consequences?**
  - ✓ serious drop in capacity and reduction.
  - ✓ serious component damage as the line of action of crushing forces are significantly altered.

# Performance versus Liner Savings

● **Reality** :If you produce 200 TONS per hour with OEM Liners  
And change them 9 times a Year operating 160 Hours month 11 Months  
= 352000 Tons per year Product. @ 9.00 = 3,168,000. \$  
Assume your costs are 3.50 a ton = **1,936,000 Profit \$.**

■ **Brand X Liners:** Now ! you produce 192 Tons per Hour with Brand –X  
And we will assume they last longer change 8 times per year , same  
production hours & we will **add (One16 hour shift)** for (1776 hours)  
= 340992 Tons per year product @ 9.00=3,068,928. \$  
Assume now your costs were 3.36 a ton = **1,923,195 Profit \$.**

**In a best case possible for brand x , You still loose over 1100.00 \$ month  
In Profit , Plus NO warrantee , Poor reliability , How do you win ???**



# Application & Selection



**Thinner**

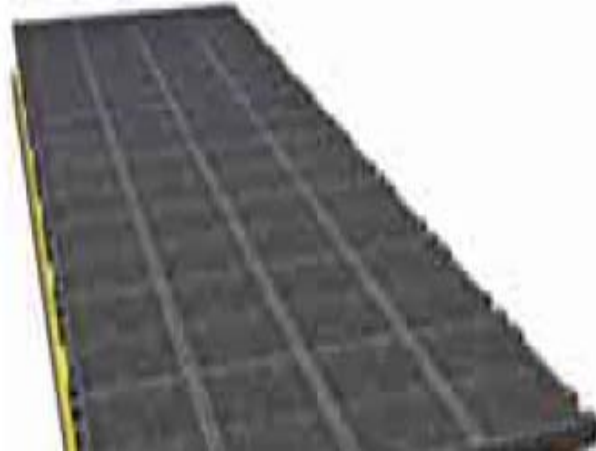
- ↑ Higher
- ↑ Better
- ↓ Shorter
- ↑ Less tendency
- ↑ Less tendency

**Capacity**  
**Accuracy**  
**Wear life**  
**Blinding**  
**Pegging**

**Thicker**

- Lower ↓
- Poorer ↓
- Longer ↑
- Higher tendency ↓
- Higher tendency ↓

# Modular Screen Panel



Material Flow is moved towards open area.

Material Can Flow  
Onto blind areas  
High potential of low  
efficiency



# Environment & Society

- Foundries utilise recycled manganese.
- Plants use High Quality Steel & Suppliers
- Use of vacuum mould process without chemical binders
- Recycles the sand in the moulding process
- Control Process over all waste & hazardous materials
- Strong social programs for employees, families.
- Ridged safety programs
- Programs against socially incorrect suppliers



# Where Can you really get your Profit!

- **Review each area of Production are you really getting the highest production**
- **Review your product yield as well as cause & effect of changes**
- **Look at your Maintenance Records for each Area**
- **Focus on Production first Keep in mind availability**
- **Focus on Mechanical Availability Keep in mind Scheduled Maintenance windows**
- **Remember Safety , Energy & Enviroment are not short term**

*[www.quarryacademy.com](http://www.quarryacademy.com)*



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