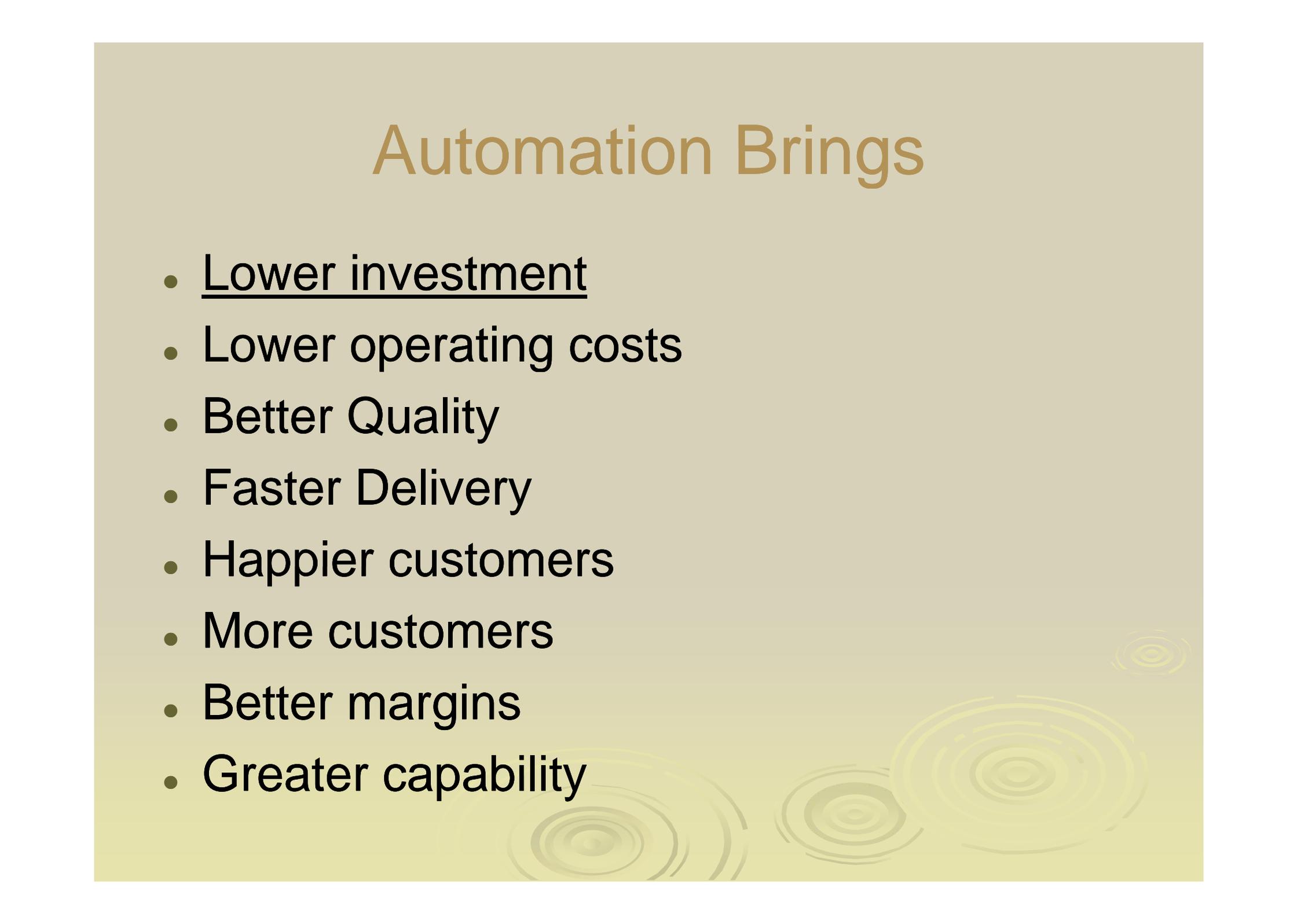


Fabrication Automation

Why Bother?



Automation Brings

- Lower investment
 - Lower operating costs
 - Better Quality
 - Faster Delivery
 - Happier customers
 - More customers
 - Better margins
 - Greater capability
- 

Automation Reduces

- Delivery times
- Stock levels
- Mistakes
- Reliance on suppliers
- Floor space
- Disputes



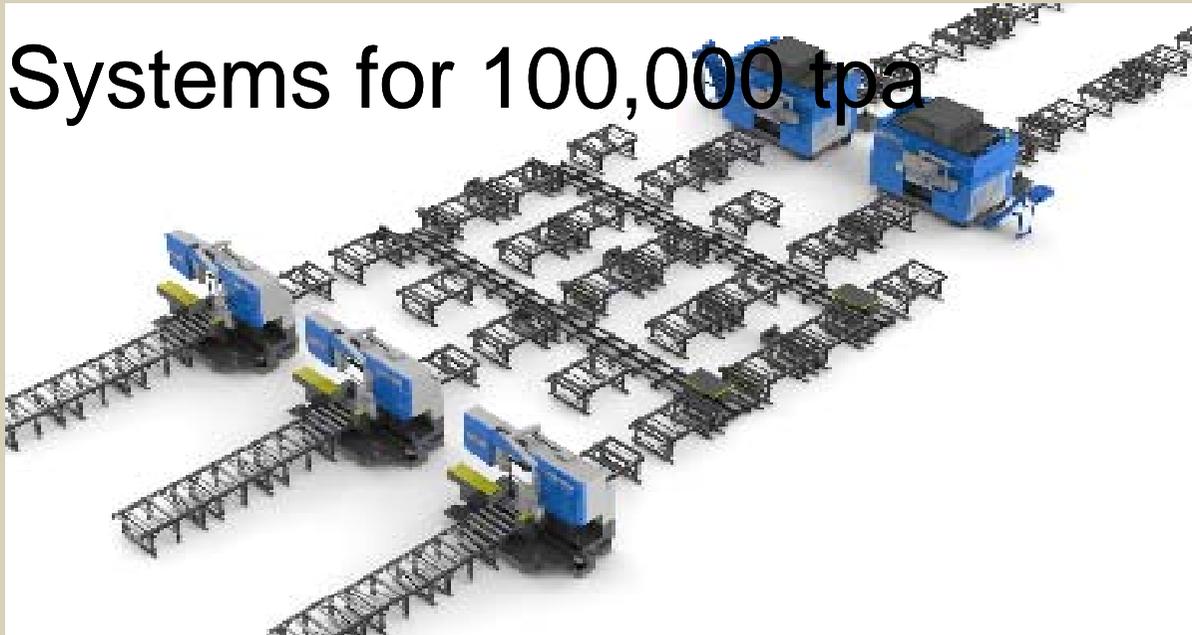
Large or Small – You Can't Afford not to Automate

- **Six trends**

- Higher output per hour from existing machines for similar prices
- Faster setup for small jobs
- Low cost machines for low volumes
- Low cost systems for high volume small parts
- Much simpler operation for easier training
- More processing per set up

Automation for large and small

- Systems for 100,000 tpa



- Systems for 2,000 tpa



Traditional Beam Line

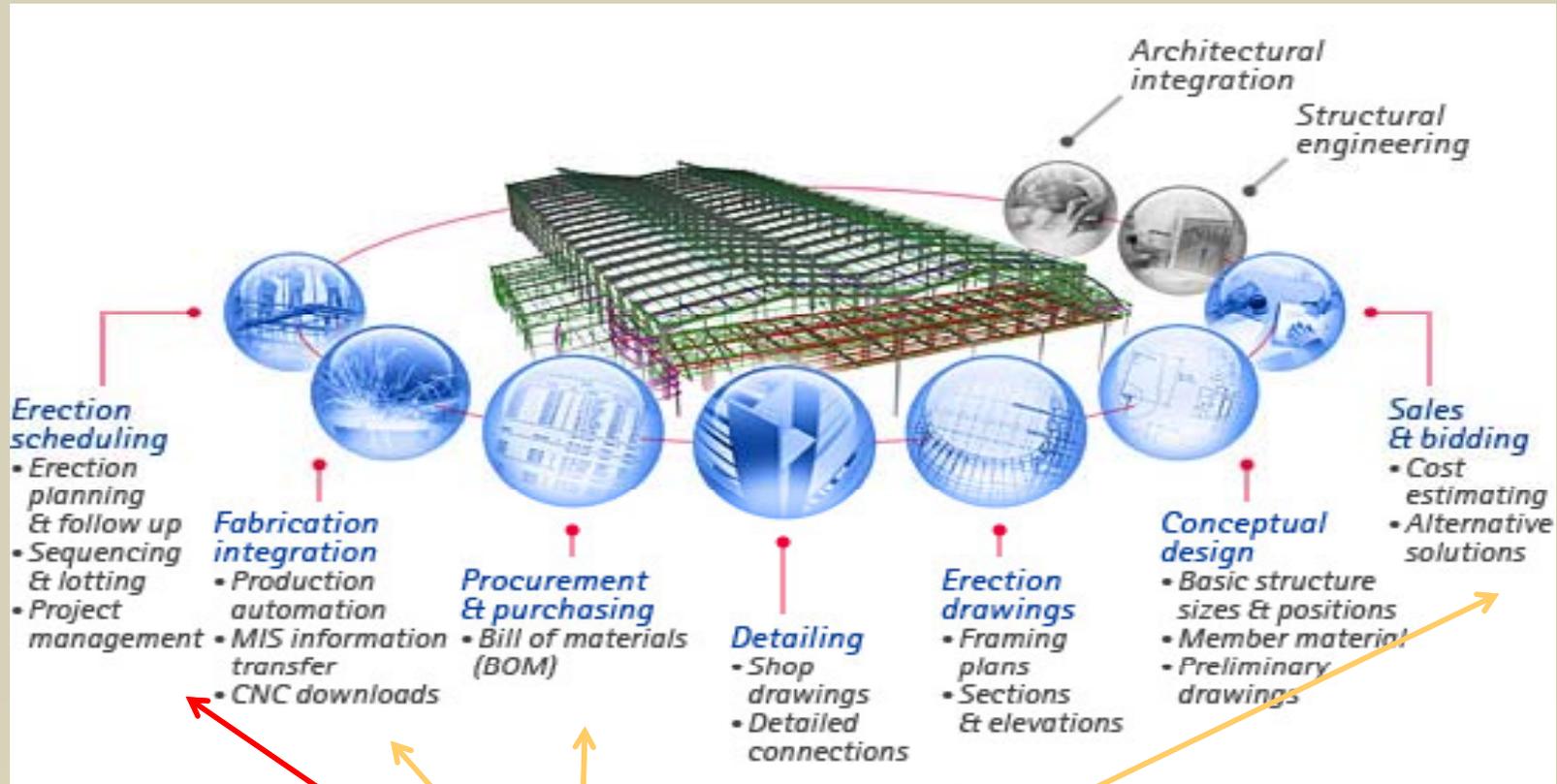


Traditional Large System



Material Flow based

Alternative View of Automation



Information Flow based

Typical Balance sheet

Conventional Operations

| Annual capacity (tpa) | 2,000 | 3,000 | 5,000 | 10,000 |
|----------------------------------|------------------|------------------|------------------|-------------------|
| Current Technology | | | | |
| Land and buildings | 2,450,000 | 3,500,000 | 5,000,000 | 8,800,000 |
| Cranes - handling eqpt. | 250,000 | 350,000 | 450,000 | 800,000 |
| Metal working, welding, painting | 250,000 | 350,000 | 650,000 | 1,500,000 |
| Weeks Stock | 7 | 7 | 7 | 7 |
| Value per tonne | 5000 | 4700 | 4600 | 4500 |
| Stock, WIP and held deliveries | 1,300,000 | 1,900,000 | 3,100,000 | 6,100,000 |
| | | | | |
| Total capital employed | 4,400,000 | 6,100,000 | 9,200,000 | 17,000,000 |

Typical Balance sheet

Highly Automated Operation

| Capacity (tpa) | 2000 | 3000 | 5000 | 10000 |
|-------------------------------|------------------|------------------|------------------|-------------------|
| Latest technology | | | | |
| Land and buildings | 1,800,000 | 2,300,000 | 3,300,000 | 5,300,000 |
| Cranes & handling equipment | 200,000 | 300,000 | 400,000 | 600,000 |
| Metal working, welding, paint | 1,100,000 | 1,900,000 | 3,000,000 | 5,400,000 |
| Weeks Stock | 4.5 | 4.5 | 4.5 | 4.5 |
| Value per tonne | 4600 | 4400 | 4250 | 4100 |
| Stock & WIP-held deliveries | 800,000 | 1,150,000 | 1,800,000 | 3,500,000 |
| Total capital employed | | | | |
| | 3,900,000 | 5,600,000 | 8,400,000 | 15,000,000 |
| Capital improvement | 400k | 500k | 700k | 2,200k |
| | 9% | 8% | 8% | 13% |

How does Automation reduce investment

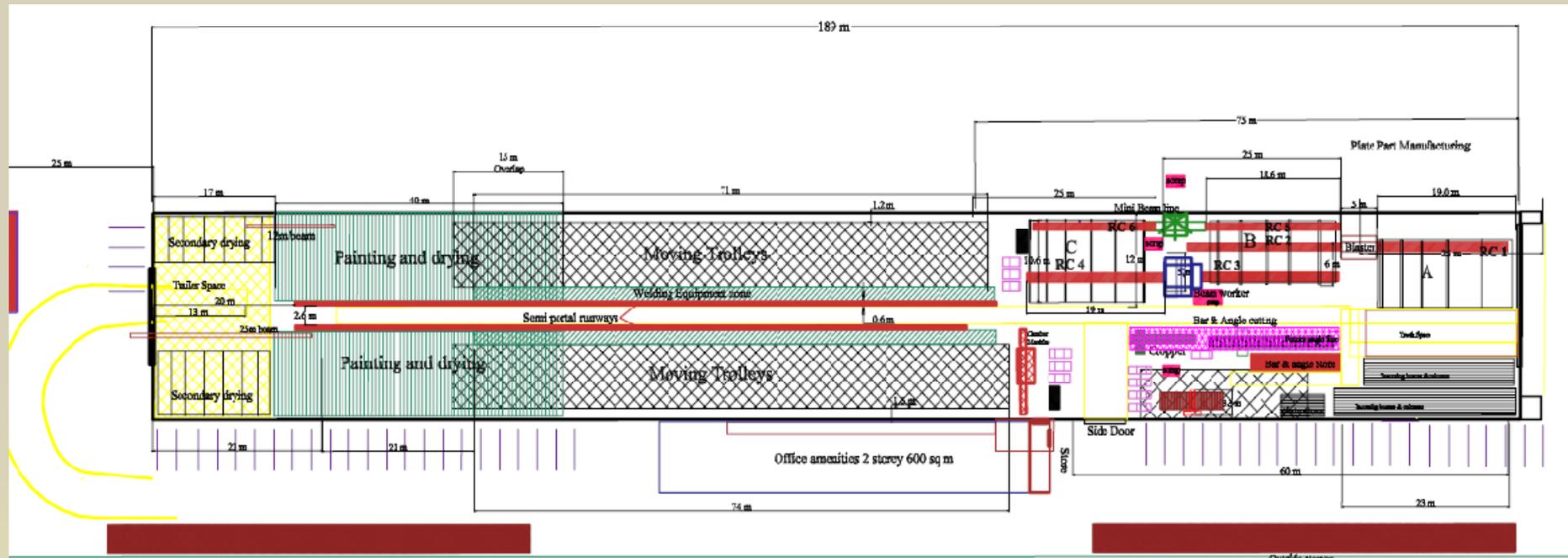
- Less Land and Buildings
 - cutting/drilling/coping/scribing
 - 50% less space
 - Robot welding
 - 40-60% less space
 - Automatic painting
 - 40-60% less space
 - Stock & finished goods
 - 30-70% less space

Reduced Space

➤ Real Customer

- Existing Output - 1 tonne/m²
 - not including beam drilling cutting or painting
 - effectively 0.7 tonnes per sq.m
- Proposed Layout 2 yrs ago-1.8 tonnes/m²
 - Including beam cutting drilling and all painting
- Next Generation layout- 3-4 tonnes/m²
 - Including all processing

2 Year old Layout



How does Automation reduce Investment

- Less stock
 - Incoming raw material not semi processed
 - Value reduced x \$200-400/tonne
 - Short Cycle time through shop
 - 2 days vs 5-10 means less WIP
 - No stock in transit to painter
 - Later start means fewer held jobs
 - Fewer mistakes/delays means less withheld acceptance for payment

Reducing cost of Investment

- Fabricator
 - 10 parts per hour
 - Cost - 30 x Operator
 - Relative cost - **300%**
- Fabricator XRP
 - 18 parts per hour
 - Cost - 12 x Operator
 - Relative cost - **66%**
- Gemini HP
 - 17 parts per hour
 - Cost – 7 x operator
 - Relative cost - **41%**
- *Gemini HD* - **30%**



How does Automation lower Operating Costs

- Lower process costs
- In house drilling <\$1.00/hole
 - Service Centre ~ \$3:00/hole
- In house plate cutting \$1.50/m
 - Steel service centre \$4:00/m
- Typical outside cutting/drilling
 - \$250 per tonne.
- In house costs
 - @ 2000 tonnes/yr ~ \$150/tonne
 - @ 5000 tonnes/yr < \$130/tonne

How does Automation lower Operating Costs

- Current technology
 - Faster fabrication
 - Scribing almost eliminates layout
 - Automated coping 5-10 times as fast as manual
 - More accurate parts drastically reduce fit-up time
- Emerging Technology
 - Robot welding
 - 2-4 times output of manual systems
 - Automated painting
 - 2-3 times output of manual systems

Faster Coping



Traditional Method-2 hrs



Coping Robot- 5 mins

Modern vs 10 yr old Technology

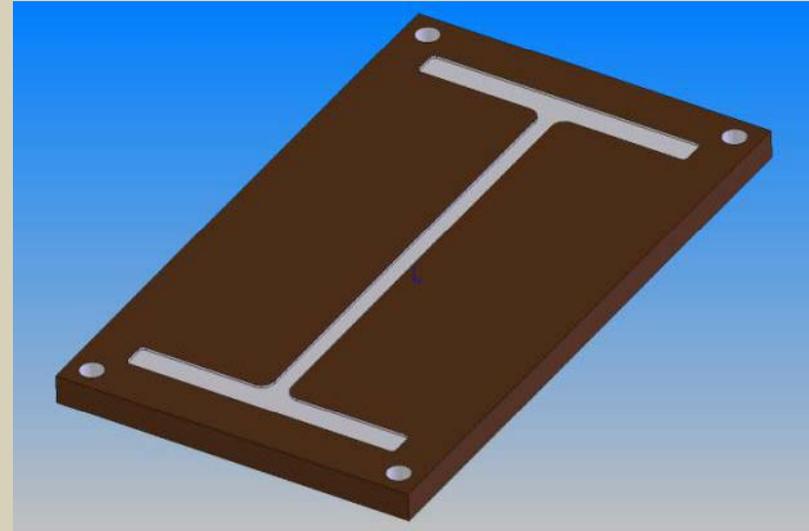
- Bandsaw $180\text{mm}^2/\text{min}$ vs 50
- 22mm Drill 400-900mm/min vs 100
- Plasma
 - 12 mm 4.4m/min vs 1.4
 - 20 mm 2.8m/min vs 0.9
- Robot welding 40-50m/hr vs manual 5-12

Increasing Margin

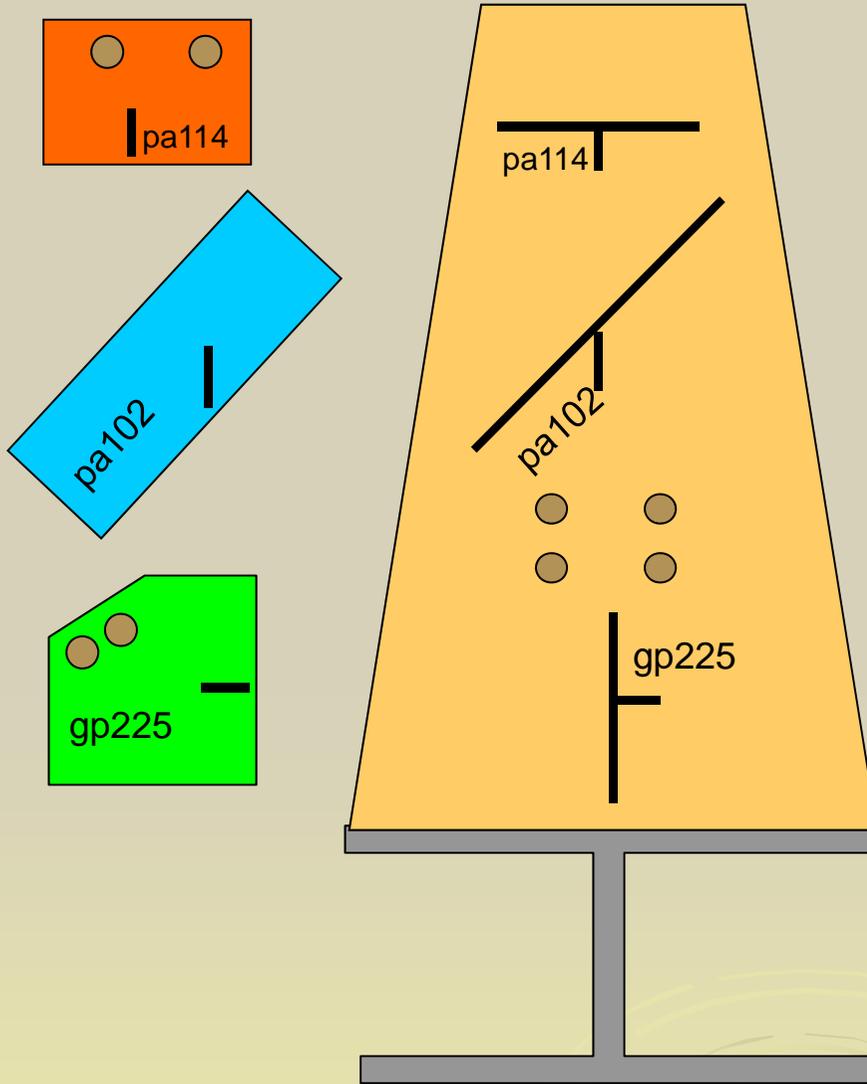
- In house drilling costs <\$1.00/hole
 - Service Centre ~ \$3:00/hole
- In house plate cutting \$1.50/m
 - Steel service centre \$4:00/m
- Typical outside cutting and drilling costs \$250 per tonne.
- In house costs
 - @ 2000 tonnes/yr ~ \$150/tonne
 - @ 5000 tonnes/yr < \$130/tonne

Increasing Value added

- Plate machining, scribing, marking and cutting in one place
- Base plate 700 x 400 x 30
 - 4 x 26 mm holes
 - Surface prep to reduce welding . 180 sq. cm.
 - - Part No. engraving
- **Cycle Time for part:
2.8 Mins**



Scribing for Quick Part Matching



Auto-Fit Beam

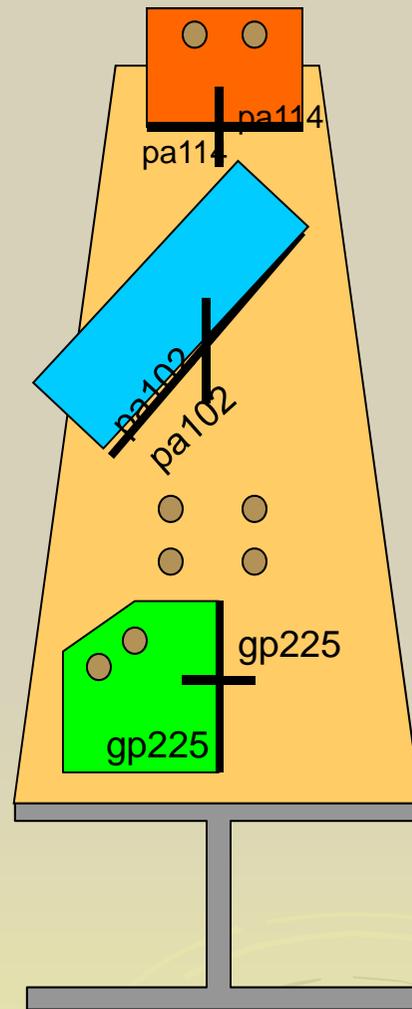
The Drill Line can scribe mark for plate weld lines, plate ID, burn lines, and holes.

ON ALL FOUR SIDES!

The Plate Processing line can make holes, plate ID, scribe lines, and burn shape.



Scribing to eliminate errors

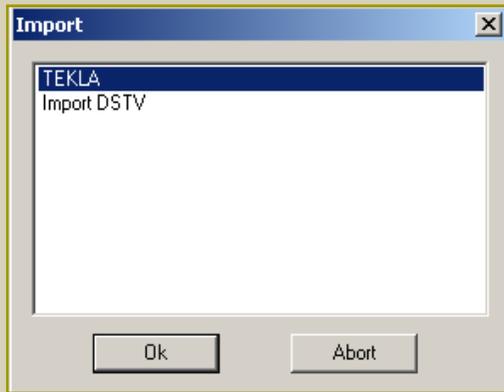


Auto-Fit Beam

Working Towards a Paperless System, Error Free Workshop

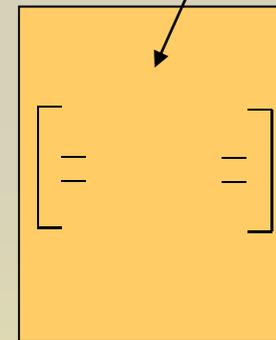
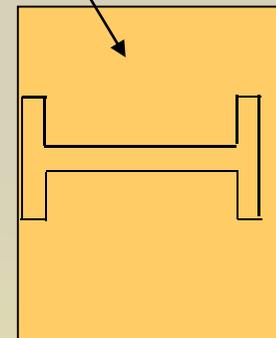
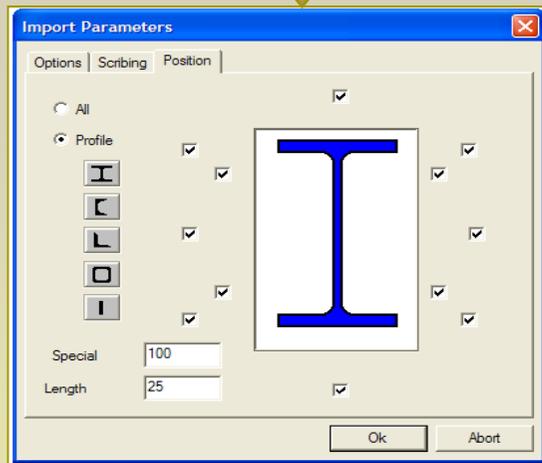


SCRIBED OUTLINE OPTIONS



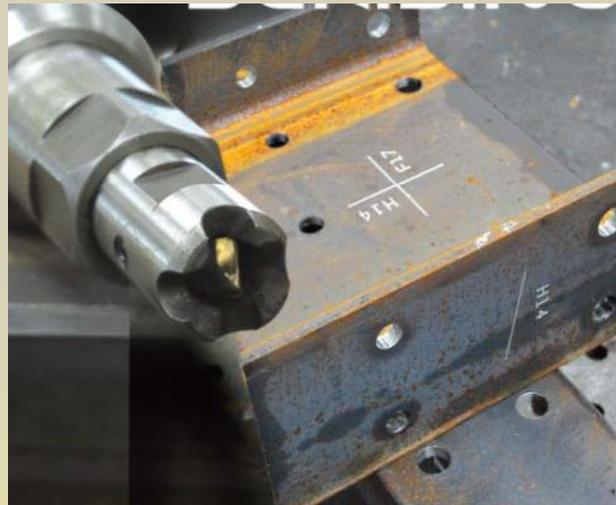
Full scribing

Customized scribing



Increasing Value added

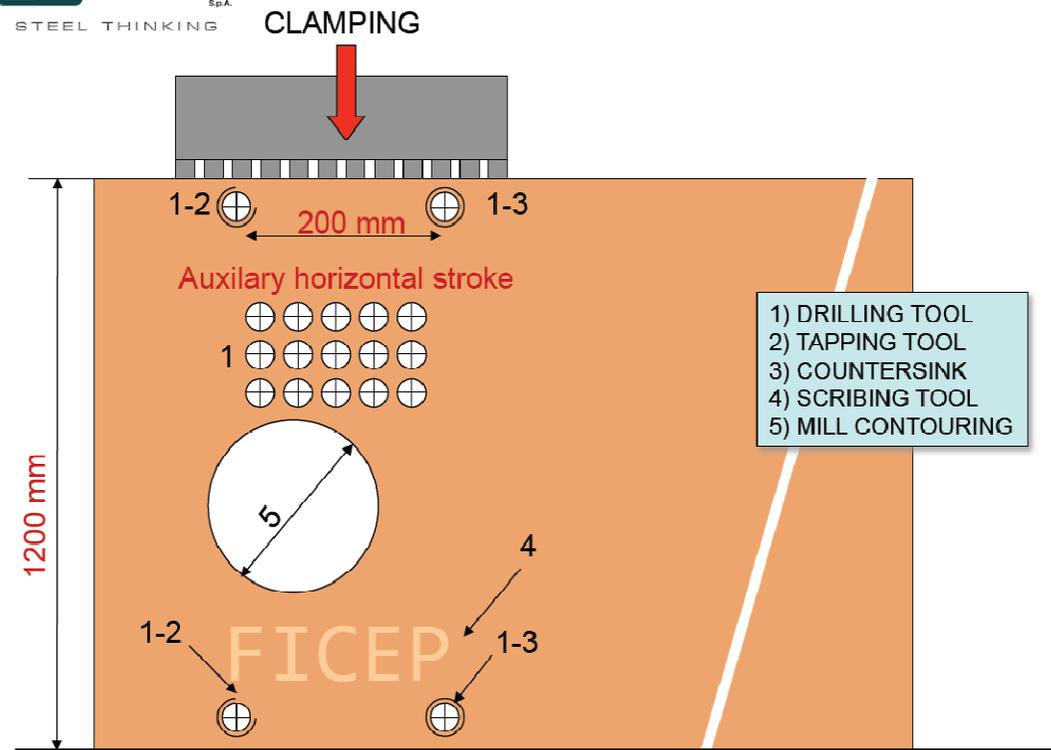
- Beam cutting, drilling, tapping, marking, scribing, coping in one pass



Fully processed parts



NEW 1201 DE EXCALIBUR 12
CNC Beams Drilling Systems



Systems sized for You

- Three spindle Beam lines with saw & coping
 - 150-250 tonnes/week
 - \$0.8-1.5m
- Single spindle 3 axis with saw
 - 120-200 tonnes week
 - \$450-800k
- Single spindle 2+1 axes w/o saw
 - 50-80 tonnes/week
 - \$250-300k



Different styles for different Businesses

Some businesses have limited sizes but not much volume.

Some businesses have large range of parts



High throughput limited size range



Wide size range, many processes
Lower throughput

Systems sized for You

- Plate Punching, Drilling, Marking, Cutting Machines
 - \$700-1,200k
 - Very fast particularly on thinner parts
- Moving Plate Drilling/marking Scribing, Cutting
 - \$500-750k
 - Fast on small thicker parts



Systems sized for You

- Moving Gantry
Drilling/Milling, Marking
Scribing Cutting
 - \$400-1,700k
 - Versatile best for larger or more complex parts
- Moving Gantry Drilling,
marking, scribing, cutting
 - \$220-\$1,400k
 - Best for simpler and large parts



Improving Customer Service

- Fewer mistakes
- Much shorter leadtime
- Better fit-up
- Quicker installation

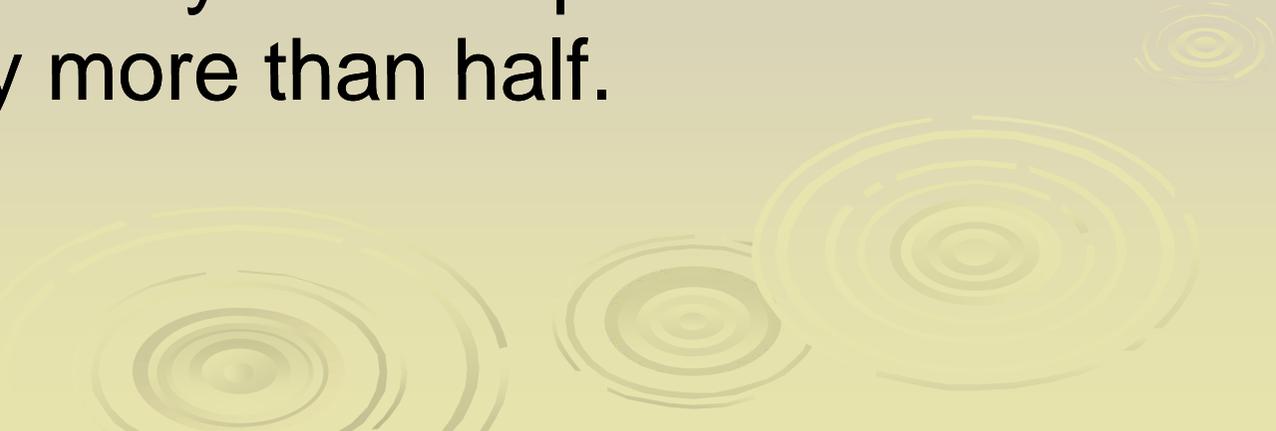


Emerging Technology

- Linking Detailing directly to fabrication
- Robot Welding
- Automatic painting

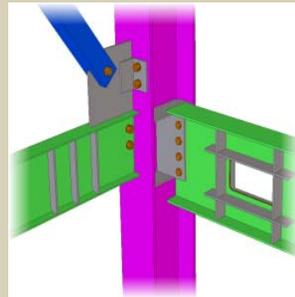
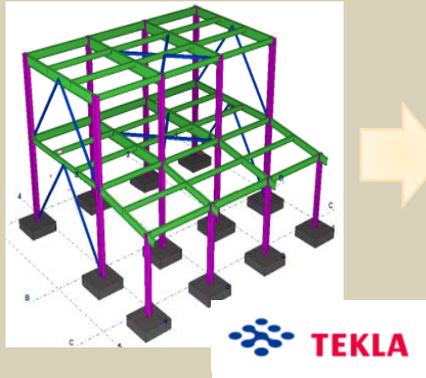


Automation - Do it or Die

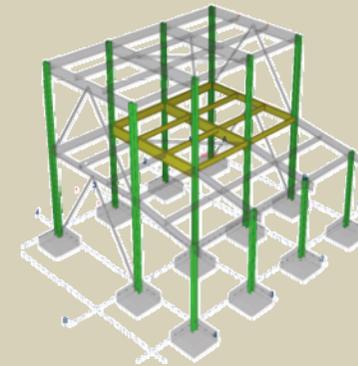
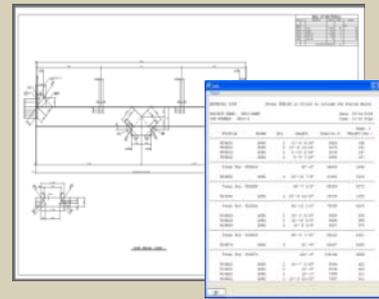
- Concrete has 75% of market for multistorey offices
 - More and more steel frames are being imported
 - Your surviving competitors are automating
 - You can reduce your cost per tonne after materials by more than half.
- 

Digitally Linked Workflow

Tekla design model Detailed Tekla model

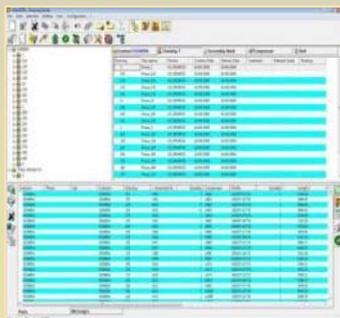


Production drawings and reports

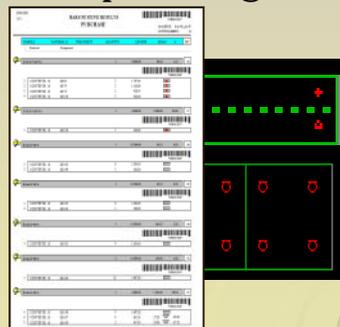


Project mgmt with 3D model

Steel Projects Estimation / Purchasing



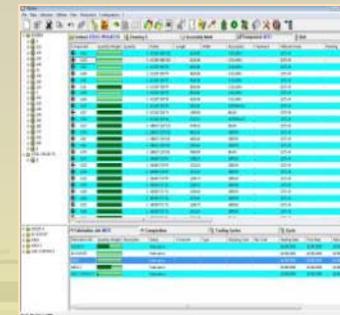
Steel Projects Production planning



Ficpe CNC fabrication, Marking



Steel Projects Project tracking



Robotic Welding

- Robotic welding
 - 3-6 times deposition rates
 - More consistent quality
 - Shorter lead times
 - Better work environment
 - Allows high speed processes e.g. twin wire Mig



Painting Productivity

- Painting System for 10 tonne per hour operated by one man
- Welded to truck < 3hrs
- Saves 600 sqm of floor space cranes lighting etc.
- Reduces storage space

Painting



Blasting, Painting, Drying



inTEC
LACKIERSYSTEME