

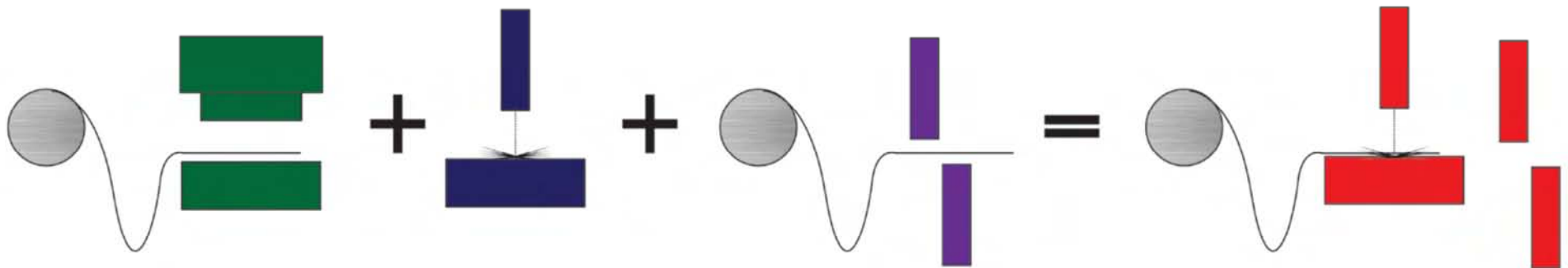


Coil Fed Laser Blanking Systems

TEMNOS: Coil Fed Laser Blanking Systems



A revolutionary system combining 3 lines into 1





Coil Fed Laser Blanking Systems

A NEW INNOVATIVE WAY TO PRODUCE BLANKS





Coil Fed Laser Blanking Systems

A NEW INNOVATIVE WAY TO PRODUCE BLANKS

- **Lower cost per part**
- **Lower energy consumption per part**
- **Greater flexibility**
- **Lower space requirements**
- **High quality**





Coil Fed Laser Blanking Systems

Laser Blanking: Key Advantages

- High powered fiber laser
- No die, die changeover & die maintenance cost
- No sheet change – cut continuously from coil
- Low installation cost and floor space
- Highly flexible Low or high volume
- Range of materials , High or low strength steel
- Decrease time to market launch
- Less scrap with nesting capabilities
- Low power consumption



Coil Fed Laser Blanking Systems

LOWER COST PER PART



LOWER COST PER PART – COMPARED TO MECHANICAL BLANKING

- Dies - for each part (with spare die in some or most cases)
- Die maintenance & storage
- Die changeover time
- Press foundation
- Building size, height
- Power requirement

Blanking press





Coil Fed Laser Blanking Systems

LOWER COST PER PART: LASER BLANKING VS. MECHANICAL BLANKING

- Galvanized cold rolled
- 0.030" thick
- 60" wide x 84" long



LOWER COST PER PART:

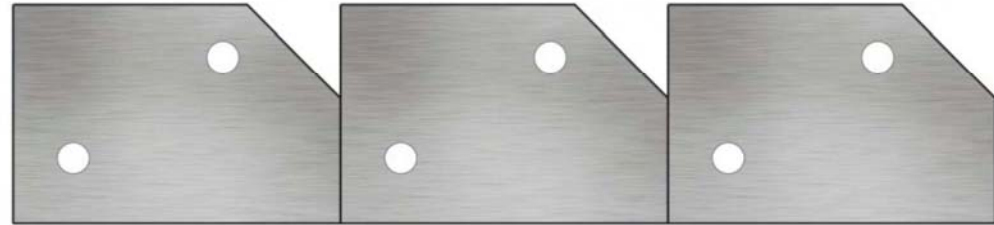
LASER BLANKING VS. MECHANICAL BLANKING

- Galvanized cold rolled
- 0.030" thick
- 60" wide x 84" long



Coil Fed Laser Blanking Systems

LOWER COST PER PART



Parameters	Press Blanking line	Laser Blanking line
Die cost	\$250,000	\$0
Line set-up time	15 min	less than 2 min
Number of parts	1,250	1,250
Parts per minute	20	6
Run time	80 min	215 min
Cost per blank	\$21.35	\$20.15



Coil Fed Laser Blanking Systems

LOWER ENERGY CONSUMPTION PER PART

Parameters	Press Blanking Line	Laser Blanking Line
Press (kW)	75	-
Laser (kW)	-	4
Chiller (kW)	-	5
Cost per (kW/hr)	\$0.09	\$0.09
Cost (per hr)	\$6.75	\$0.81
Production rate	80	215
Total cost (per hr)	\$9	\$2.90



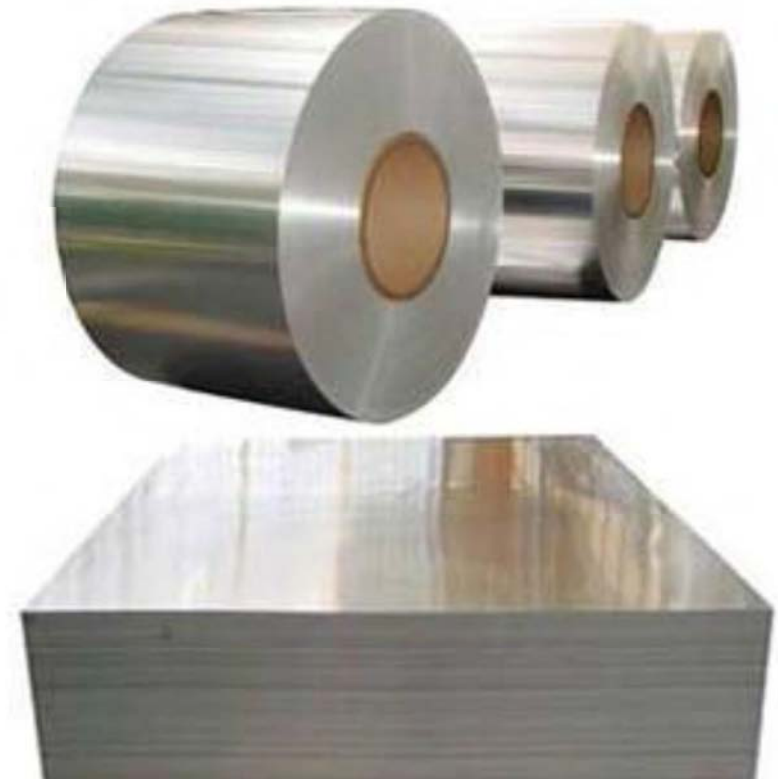
Coil Fed Laser Blanking Systems

GREATER FLEXIBILITY

- **Change-over time to download a new part**
- **No die changeover time**
- **Make changes to nesting program vs. hard tooling**
- **Material changes, manufacturing change**
- **Low, medium or high volume part platforms**
- **Low, medium or high strength steel**
- **Faster to market vs. traditional die development timeline**

LOWER COST PER PART - COMPARED TO SHEET FED LASERS

- Purchase cut to length sheets vs. coil
- Inventory of sheets
- Change over of sheets
- Material utilization with sheet vs. coil

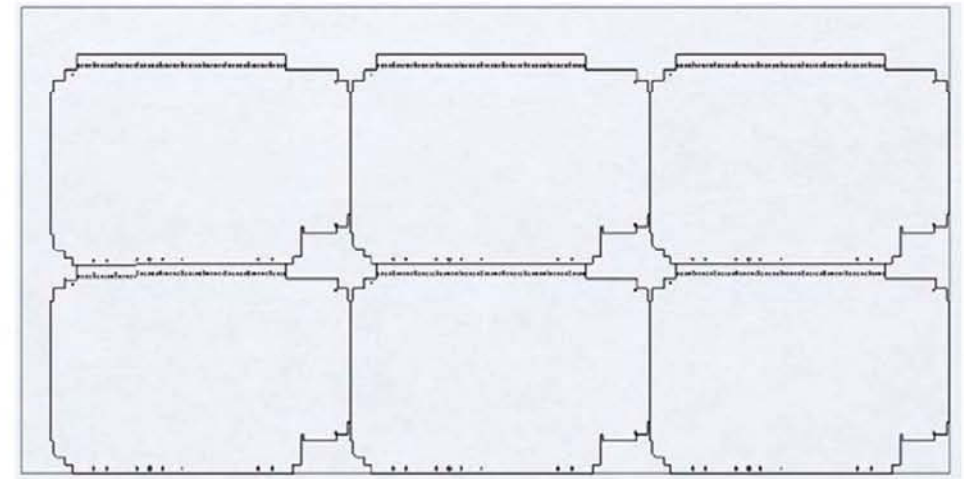
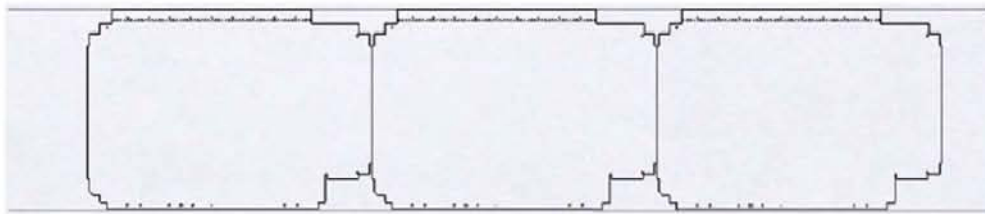


LOWER COST PER PART:

COIL FED LASER VS. SHEET FED LASER

Nested on a 5' x 10' sheet

Run sequentially from coil



Material – 18ga (.048") Steel

Part size: 27" x 39"

Production Run – 1,300 Pieces



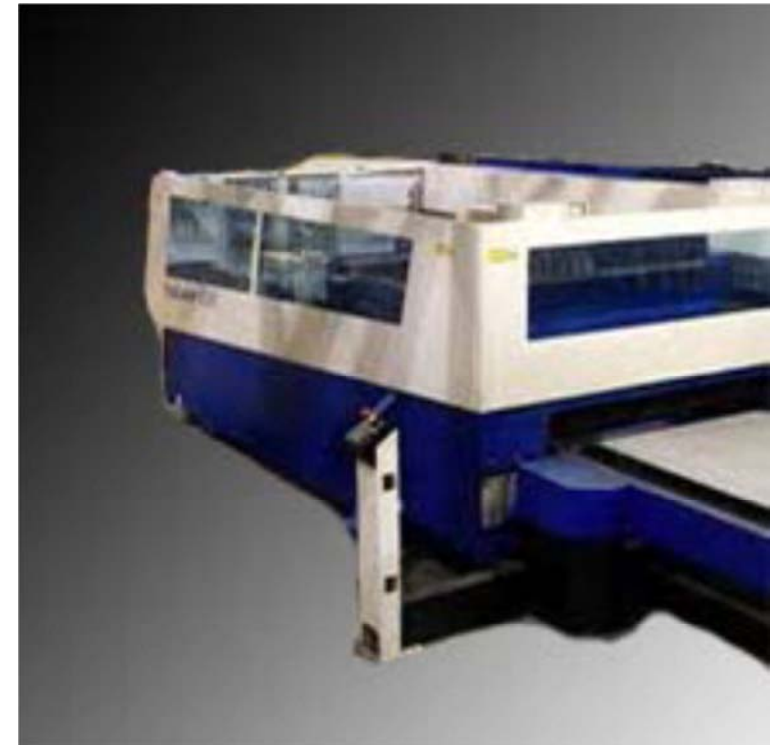
Coil Fed Laser Blanking Systems

LOWER COST PER PART:

COIL FED LASER

VS.

SHEET FED LASER

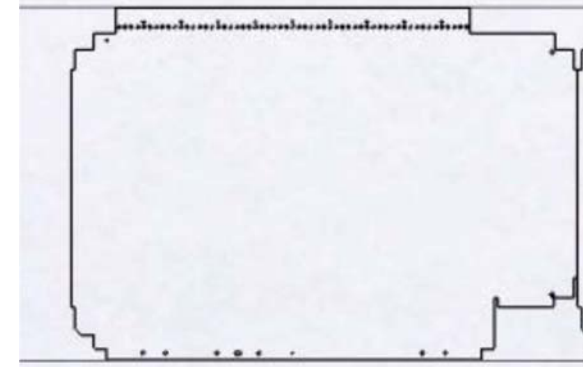




Coil Fed Laser Blanking Systems

LOWER COST PER PART:

Cabinet part



Parameters	Sheet Fed Laser	Laser Blanking Line
Hours to complete production	31.25	8.67
Material cost	\$9,102	\$7,283
Labor cost to stack cut parts	\$1,356	\$0
Scrap rate	19%	6%
Cost per part	\$8.02	\$5.68



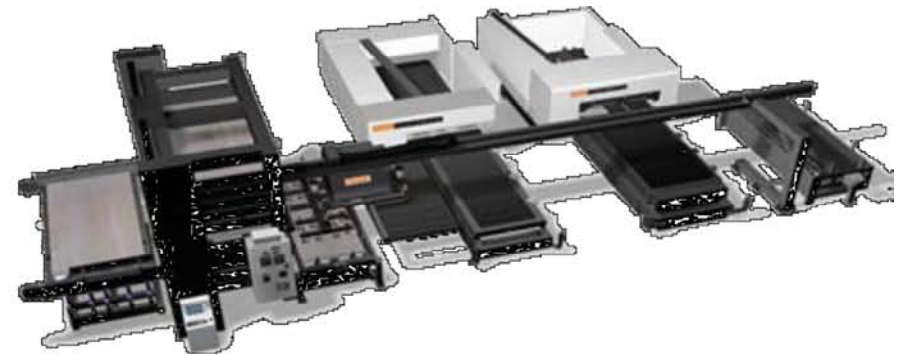
Coil Fed Laser Blanking Systems

LOWER COST PER PART:

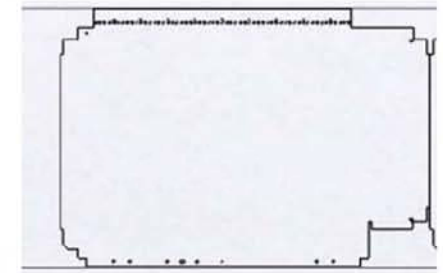
COIL FED LASER

VS.

SHEET FED LASER



LOWER COST PER PART:



Cabinet part

Parameters	Automated Sheet Fed Laser	Laser Blanking Line
Hours to complete production	13.18	8.67
Material cost	\$9,102	\$7,283
Labor cost to stack cut parts	\$1,085	\$0
Scrap rate	19%	6%
Cost per part	\$7.82	\$5.68



Coil Fed Laser Blanking Systems

GREATER FLEXIBILITY

Part Nesting

- Nest parts by parameters
- Coil Width, OD, ID
- Optimal coil width
- Optimal material utilization
- Calculated Outputs
- Part cycle time
- Total coil cycle time
- Parts per coil
- Scrap usage



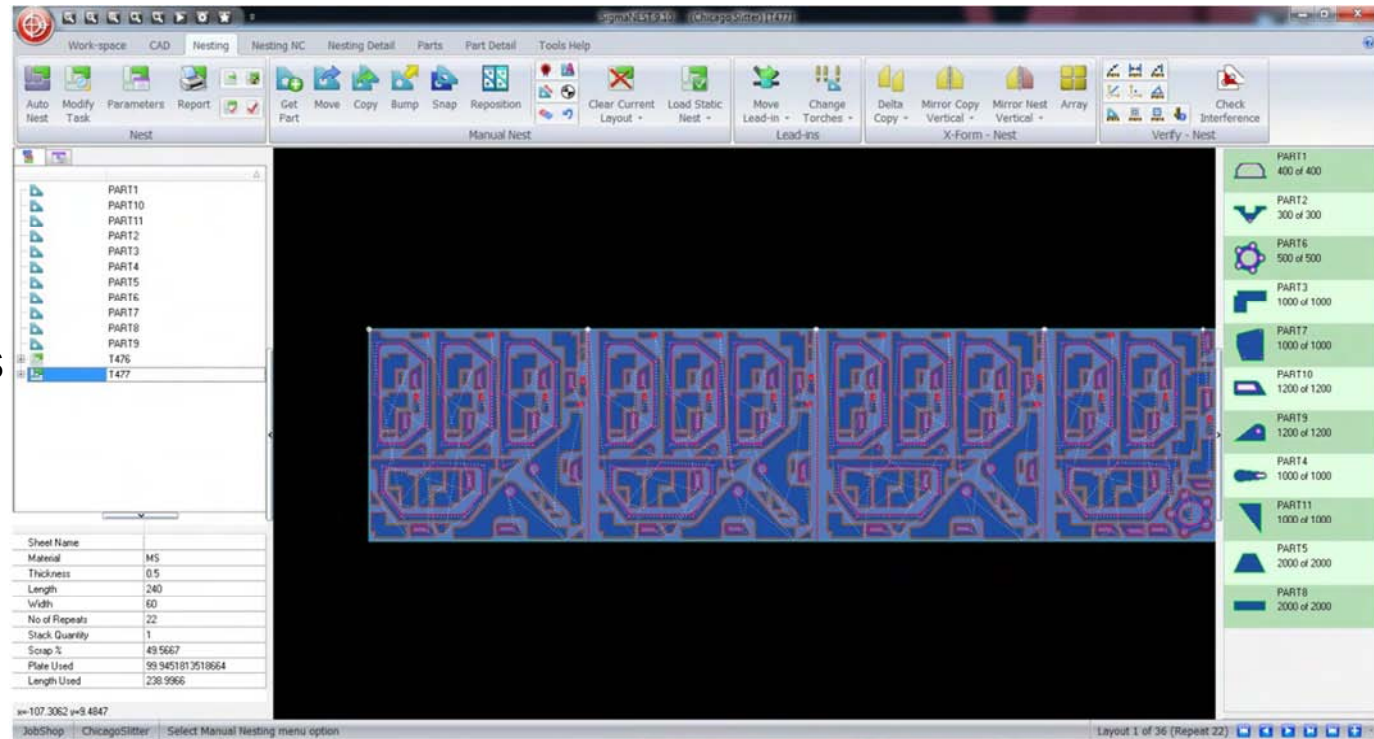


Coil Fed Laser Blanking Systems

GREATER FLEXIBILITY

Part Nesting

- Import CAD drawings
- Multiple part nesting
- Coil & scrap optimization
- Part cutting simulation
- Standard or custom reports





Coil Fed Laser Blanking Systems

GREATER FLEXIBILITY

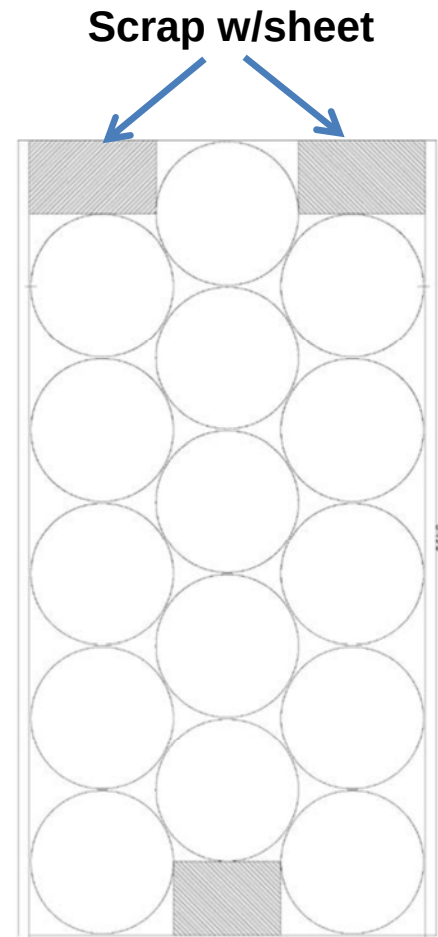
Part Nesting Reduction Analysis

Sheet Fed vs. Coil Fed – Round disc Based on number

of sheets vs. single coil

Reduce scrap by 7.5-10% (from 24-14%)

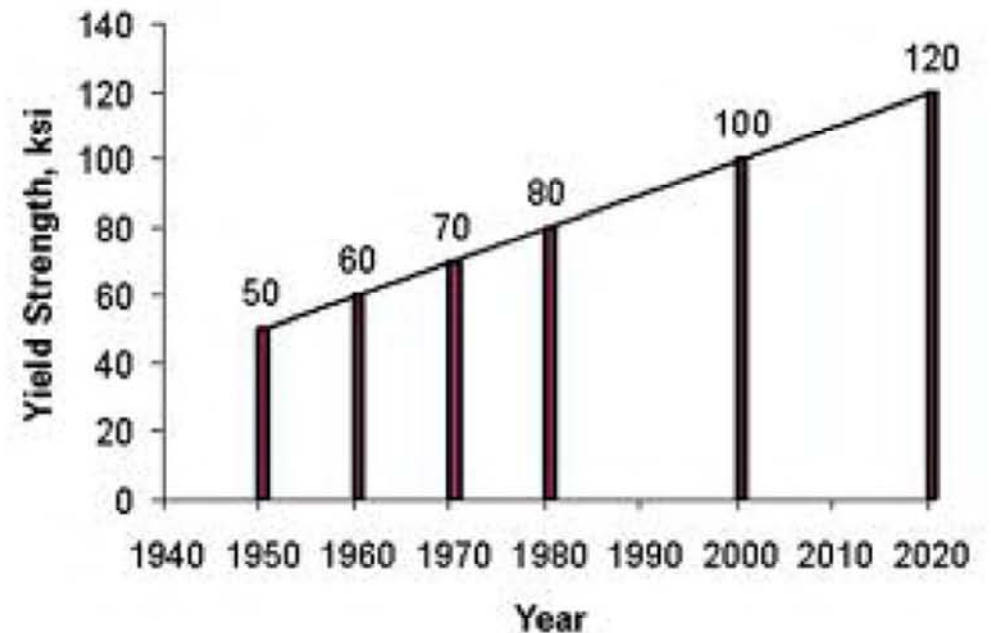
Cost savings approximately \$2,500



GREATER FLEXIBILITY

Traditional Blanking Line & High Strength Steel

- Die maintenance + more wear = less die life
- Up to 50 - 75% less die life
- Increased press tonnage required



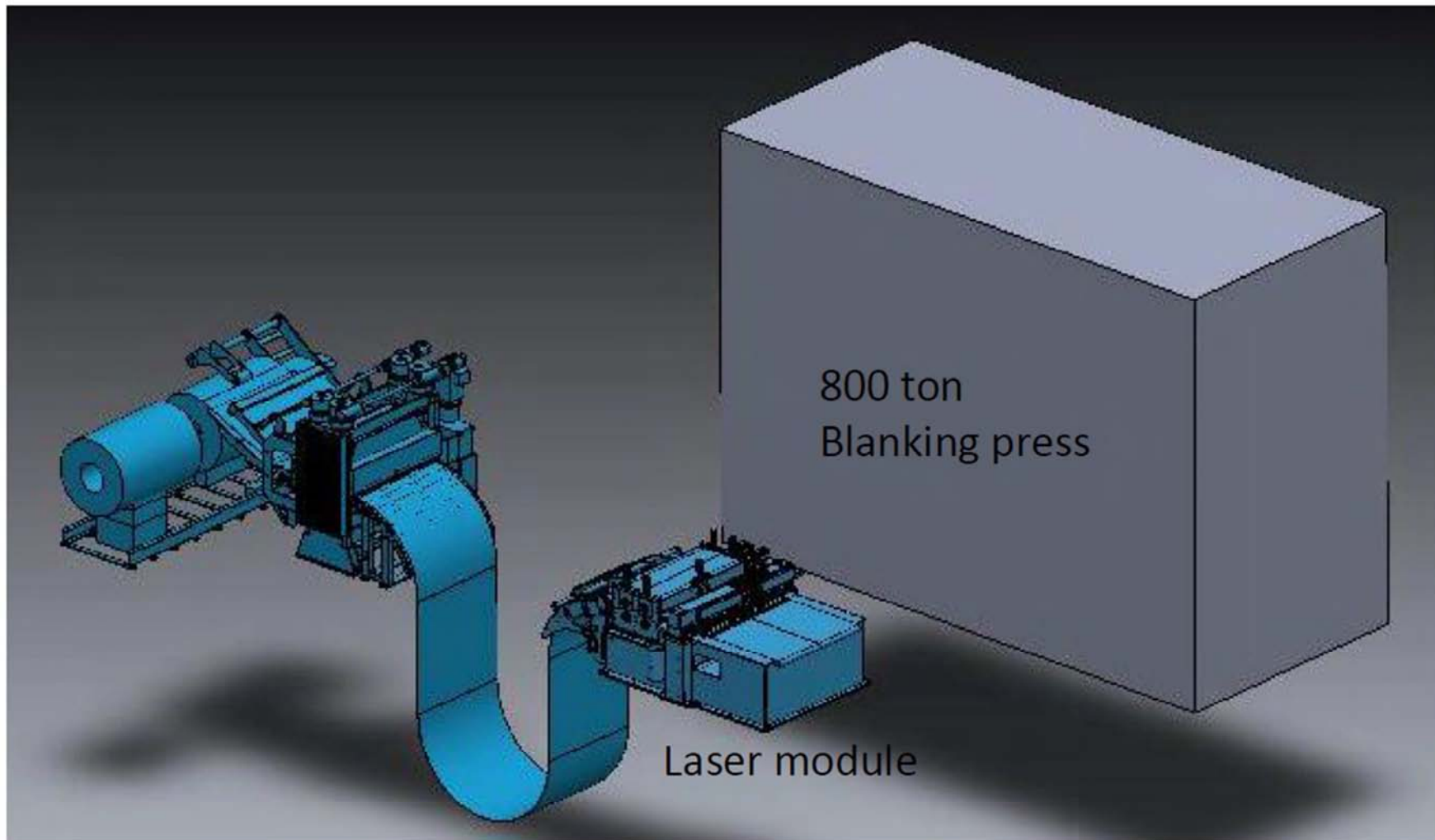
LOWER SPACE REQUIREMENTS

- Standard building height
- 30% Less floor space
- No die storage or maintenance area



LOWER SPACE REQUIREMENTS

LASER BLANKING COMPARED TO PRESS BLANKING





Coil Fed Laser Blanking Systems

LOWER SPACE REQUIREMENTS

Line foot print (sq. ft)	6,250	8,000
Die maintenance area (sq. ft)	0	2,000
Total square feet	6,250	10,000
Cost per sq. ft (\$5.00)	\$31,250	\$50,000
Savings		\$18,750
Less space required		38%
Building Height (ft)	20	30
Press Foundation depth (ft)	0	15
Looping Pit (ft)	15	15



Coil Fed Laser Blanking Systems

HIGH QUALITY

- Cut quality monitoring
- Laser never wears out
- Process consistency
- Cutting high strength steel vs. mechanical blanking





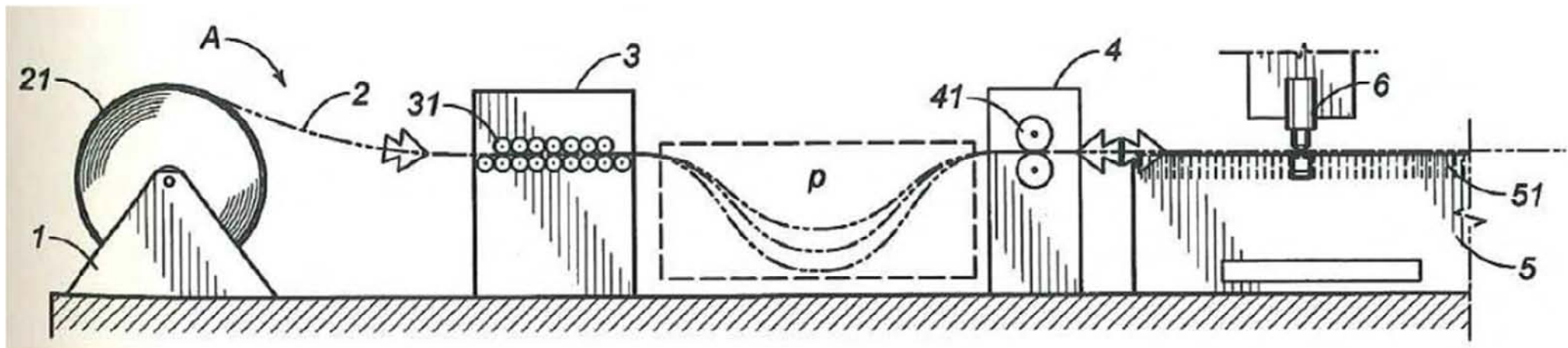
Coil Fed Laser Blanking Systems

IRON LASER BLANKING LINE - KEY FEATURES

- **Coil fed fully integrated solution**
- **Patented laser cutting process Combination roll feed and laser traverse**
- **Eliminates flash back on the bottom of the part**
- **Fumes and contaminants removed via vacuum/exhaust system**
- **Trap door-scrap or “side out” parts**
- **Integrated high speed shear**
- **Line processes configured and sheared blanks**
- **Integrated finished part handling**

HOW IT WORKS

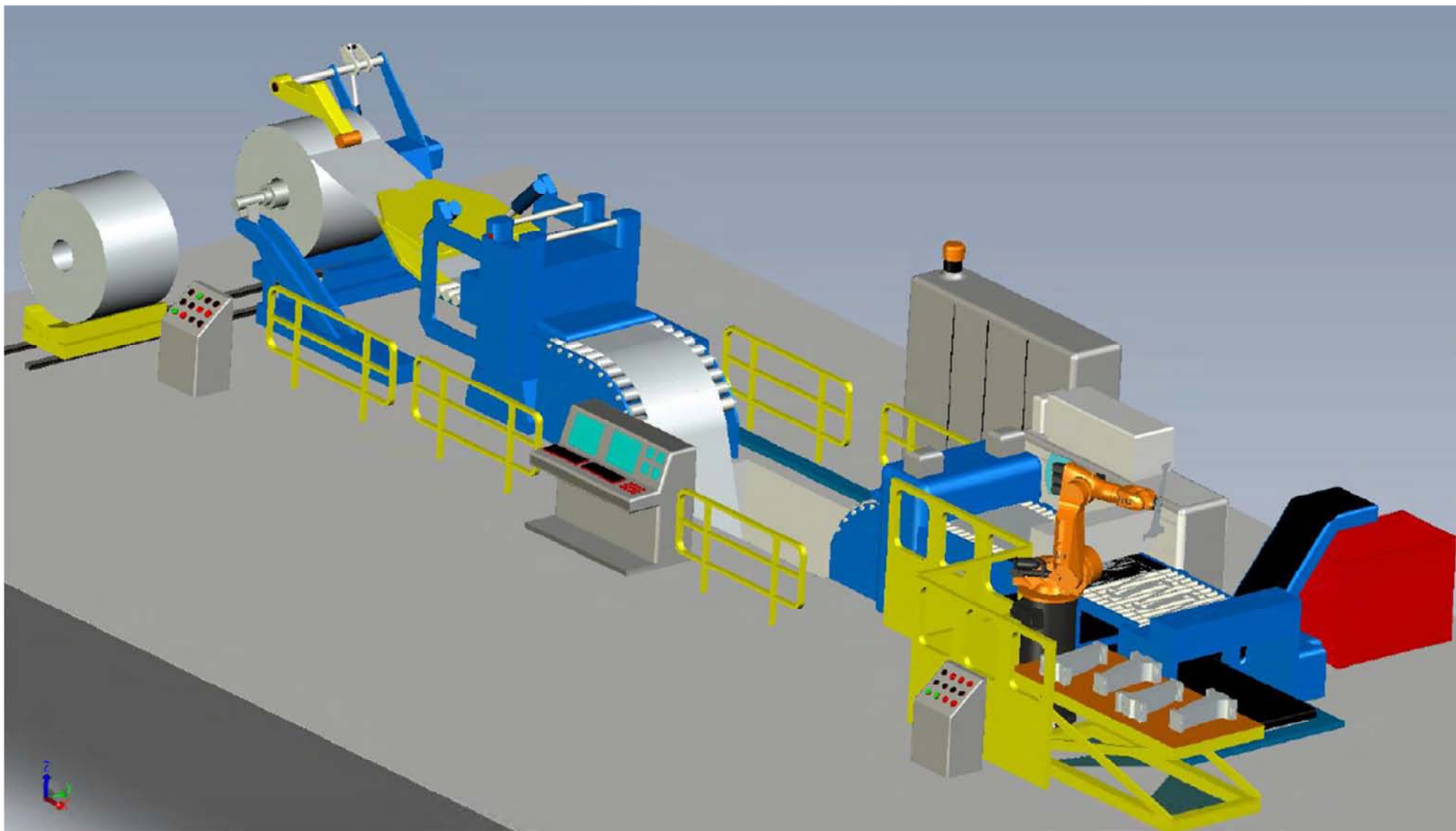
1. Parts nesting via CAD/CAM download
2. Coil feeding
3. Roll feed integration with laser module
4. Laser cutting (roll feed and laser axis)
5. Prime part handling
6. Scrap handling



US Patent # 6,563,081

Italian Patent # 1,316,478

COIL FED LASER BLANKING LINE



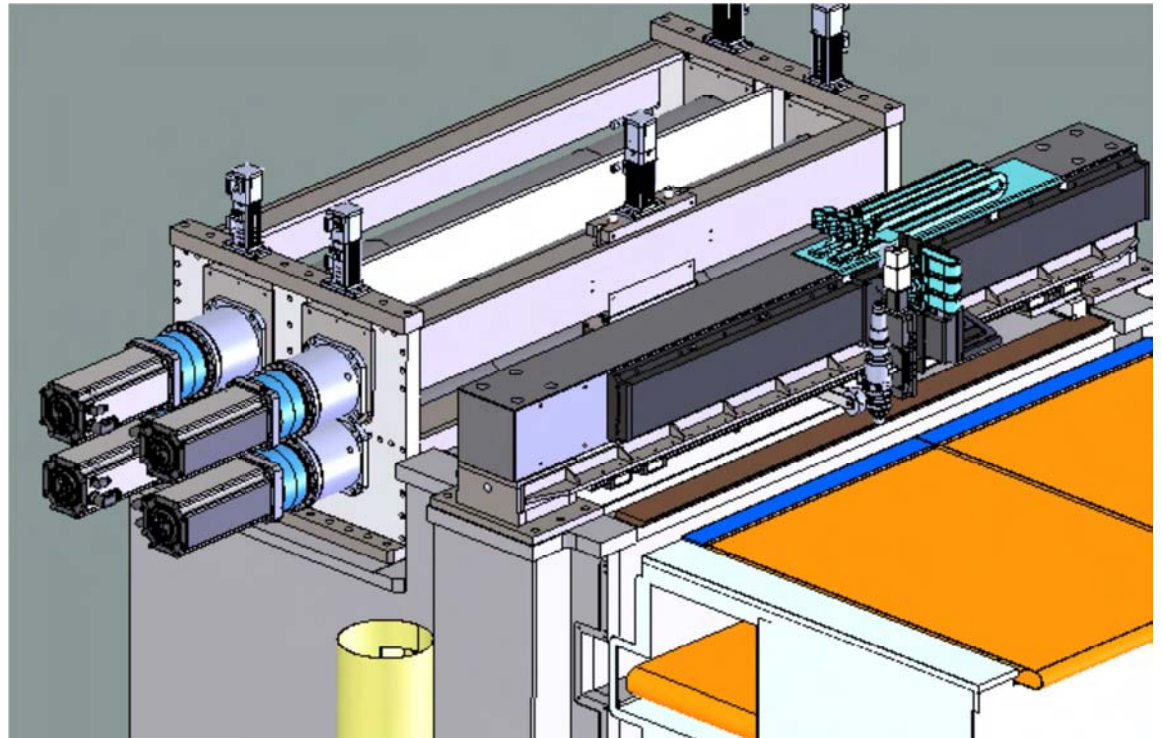
COIL HANDLING & COIL FEED-UP

- Resembling traditional blanking lines
- Coil cars, unwinds, levelers, wash units
- Consistent cycle times with automatic feed up
- Bar code scanning and integration to MRP/ERP system



LASER CUTTING MODULE: KEY INNOVATIONS

- Tandem servo controlled roll feed
- High speed, high efficiency fiber laser
- Multi-axis laser head control Y, X and X1
- Closed loop control system



LASER CUTTING MODULE

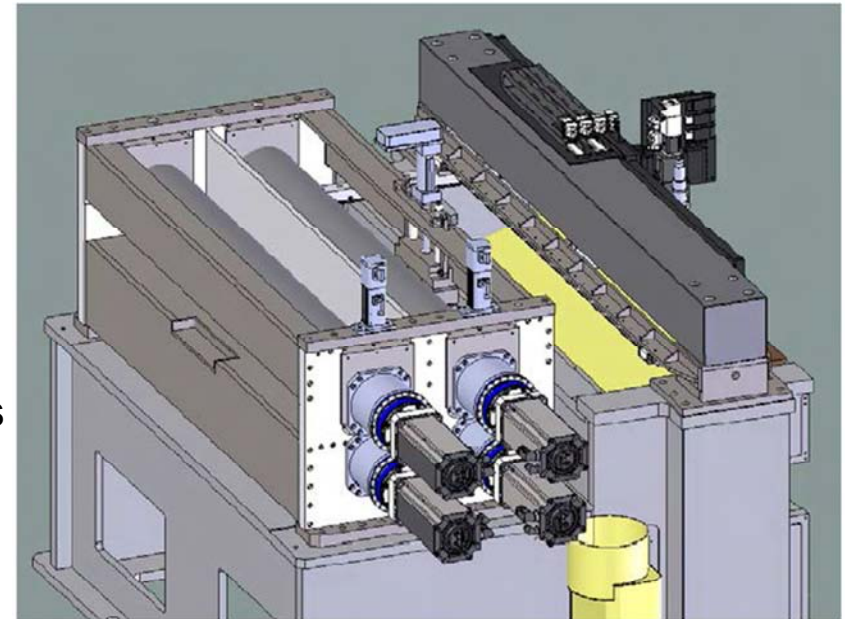
- Roll feed traverses sheet in “X” axis
- Laser traverses in “Y” axis No Flashback due to sheet supportable
- Higher quality cut



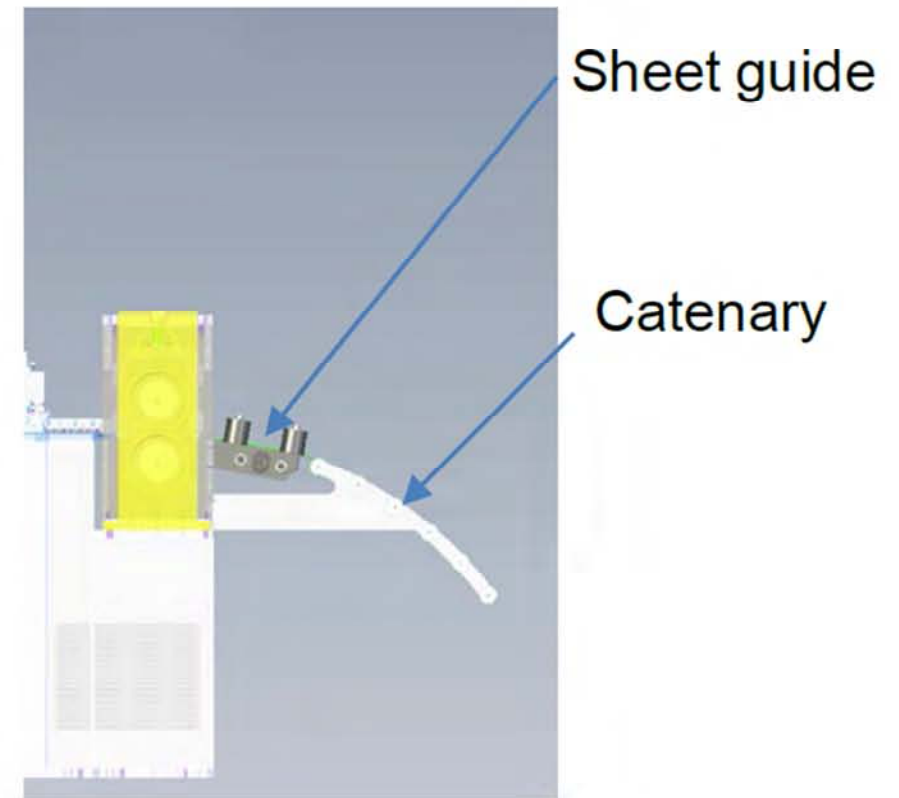
LASER CUTTING MODULE

Roll Feed & Sheet Guide:

- Servo driven
- Precision anti-backlash gearbox and servo couplings
- Feed rolls with anti-slip covering
- Servo roll pressure adjustment (closed loop)
- Full contact sheet guide



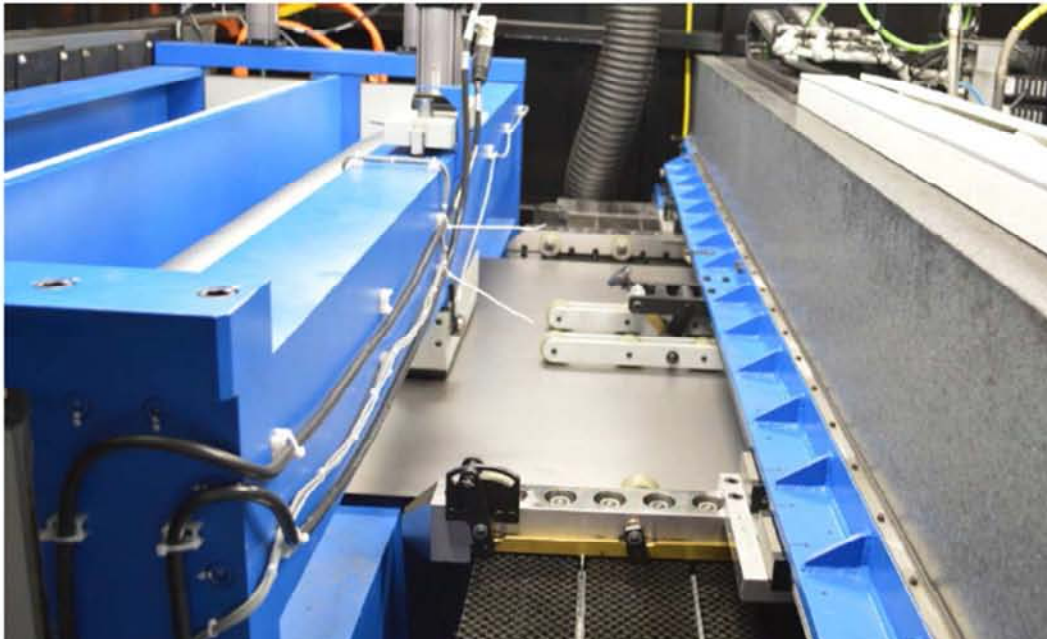
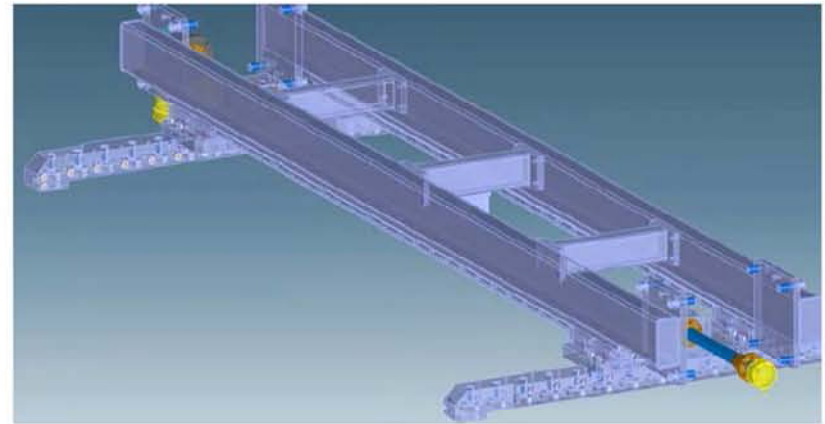
LASER CUTTING MODULE



LASER CUTTING MODULE

- Exit sheet guide after roll feed
- Ensures cutting accuracy

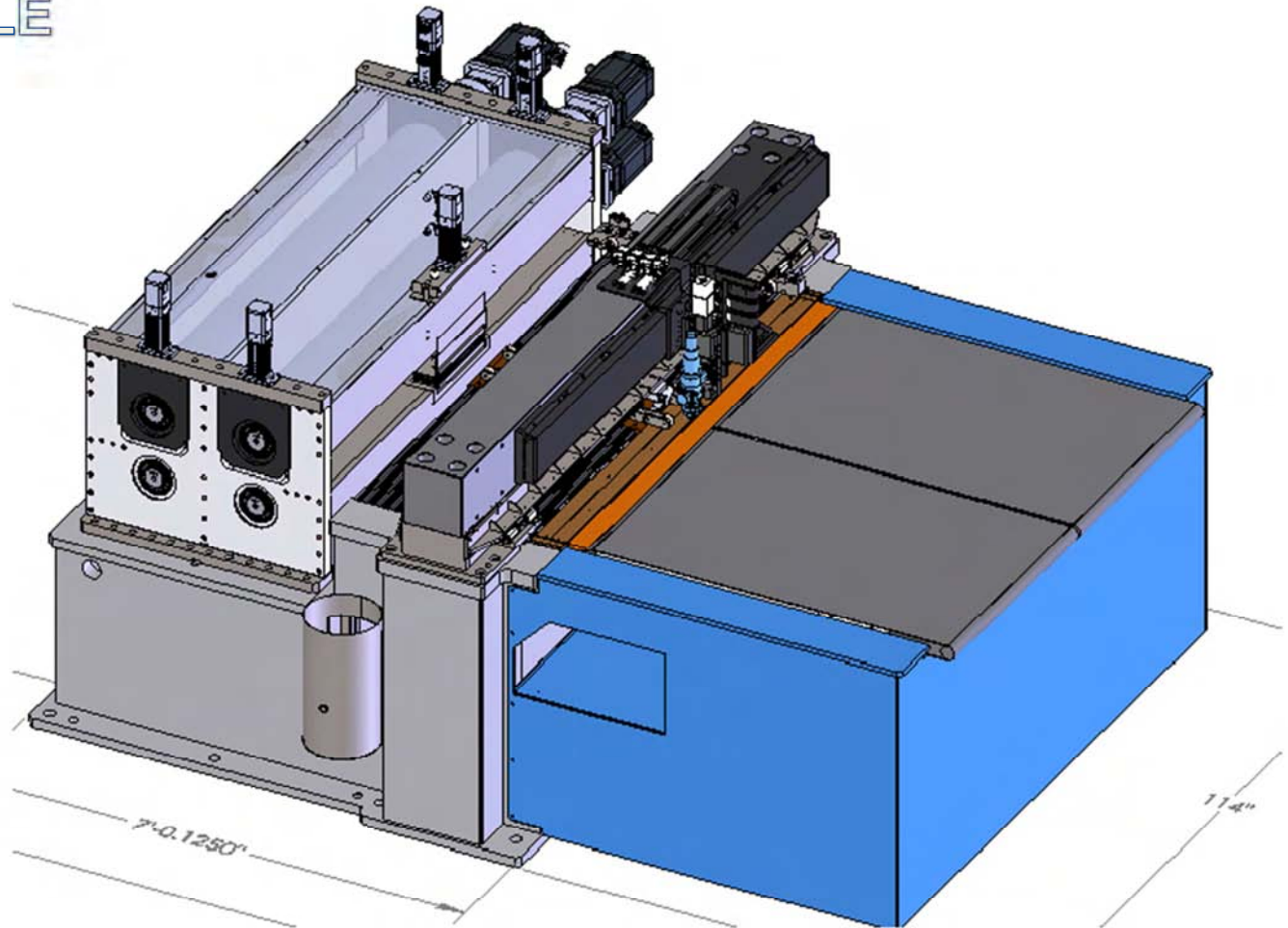
Sheet direction



LASER CUTTING MODULE

Laser Gantry Axis:

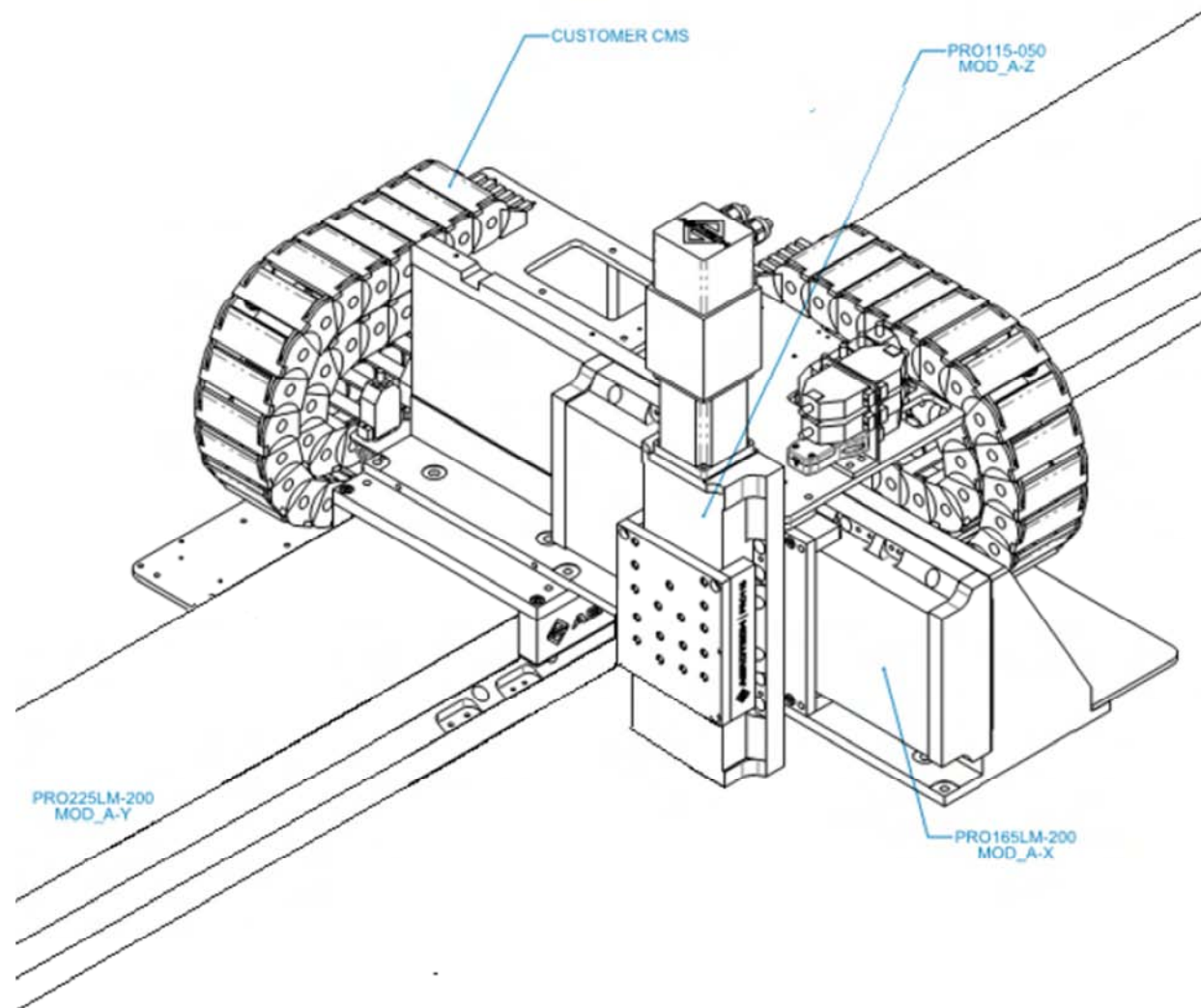
- Linear bearings and servo driven
- Linear bearing for Y and X1 axis
- Robust structure to reduce vibration



LASER CUTTING MODULE

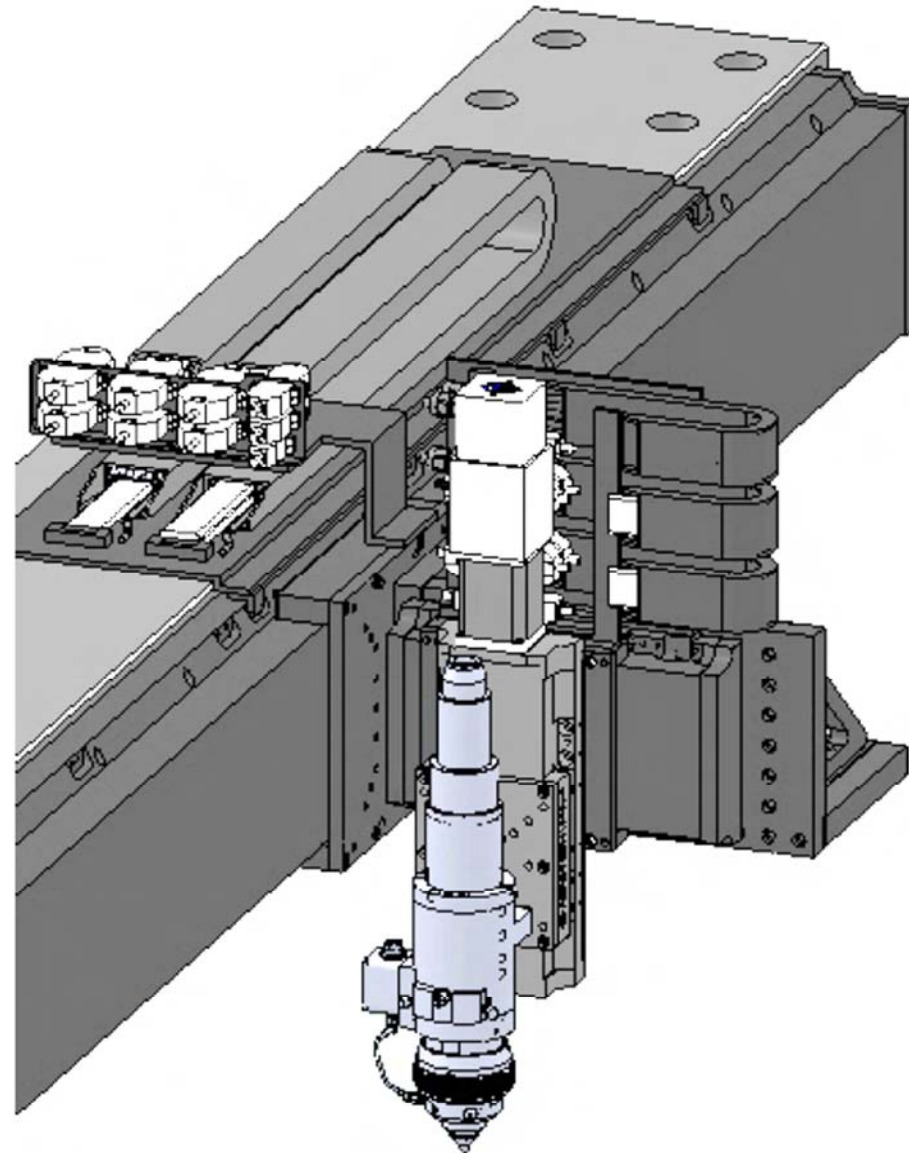
Fast, short strokes for local movements Addition of X1 drive axes

- Capable of wide speed ranges
- Y axis 4700 ipm (120m/min)
- X axis 2800 ipm (70m/min)
- Seamless CNC integration



PROCESSING HEAD

- Light weight
- Closed-loop height sensing
- Protection glass
- Range of nozzle options
- Crash protection
- High pressure assist gas
- Precision focal adjustment





Coil Fed Laser Blanking Systems

FIBER LASERS KEY ATTRIBUTES

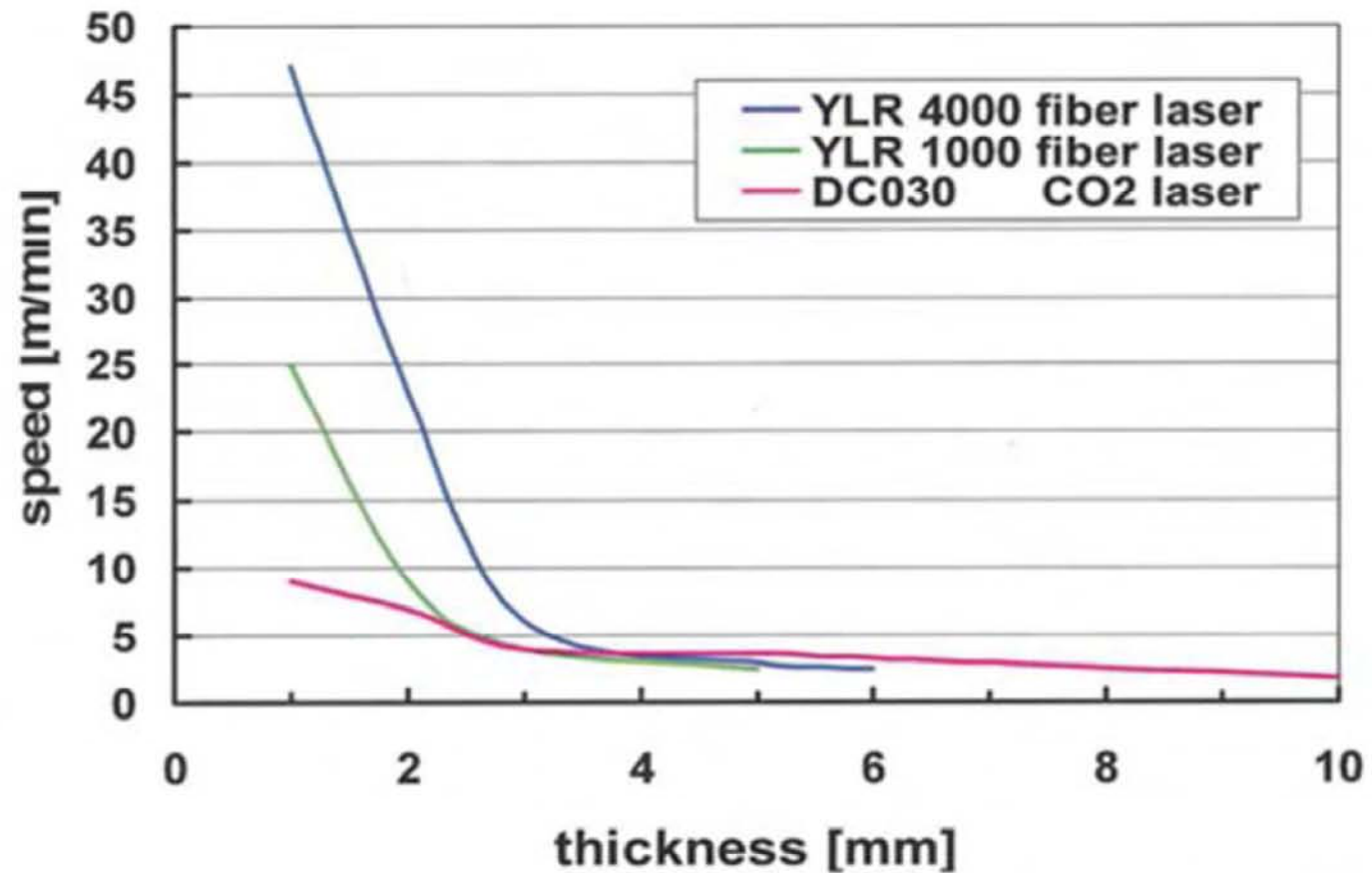
- **Faster cutting speed at thin gauges (< 2mm)**
- **Low maintenance (50,000+ hrs), reliable solid state design.**
- **No optics or mirrors to align, no gases to regulate**
- **Energy efficient, 70% less power consumption**
- **Lower cost of ownership**
- **More efficient coupling of energy into material Cold Rolled steel absorption: CO2 – 15% vs. Fiber – 25%**

Cutting with Fiber Lasers

Comparison of max. cutting speeds with different lasers

construction
steel (St1203)

cutting gas: O₂



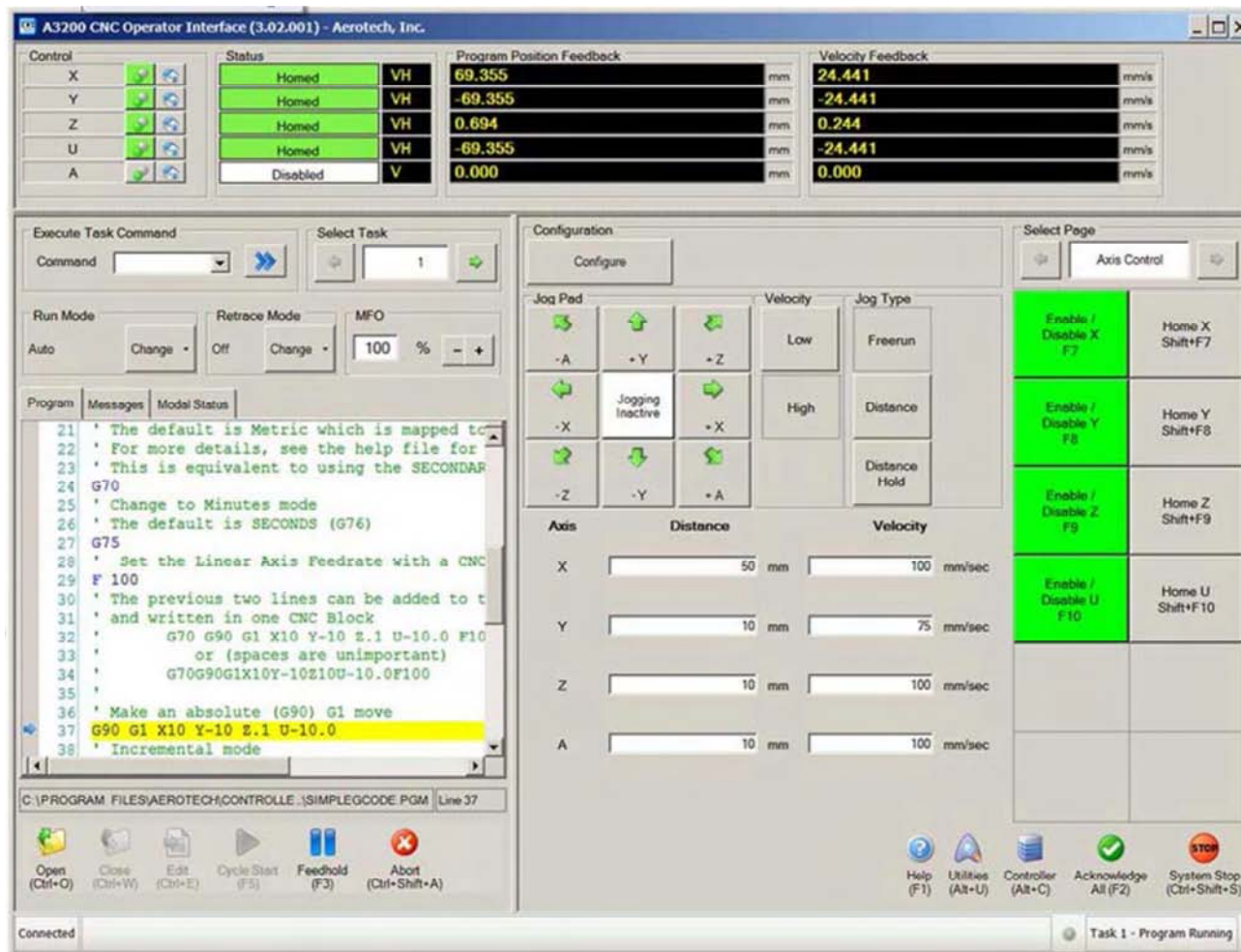
Source: IPG Photonics



Coil Fed Laser Blanking Systems

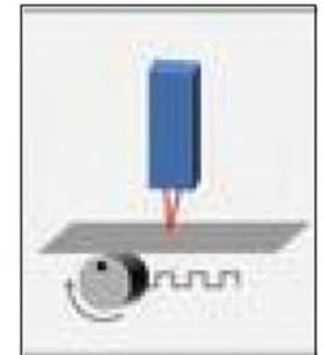
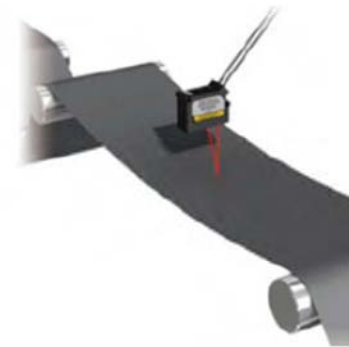
CNC CONTROL SYSTEM

- PC based CNC controller
- Repeatability and accuracy
- Standard M and G codes



SHEET POSITION FEEDBACK

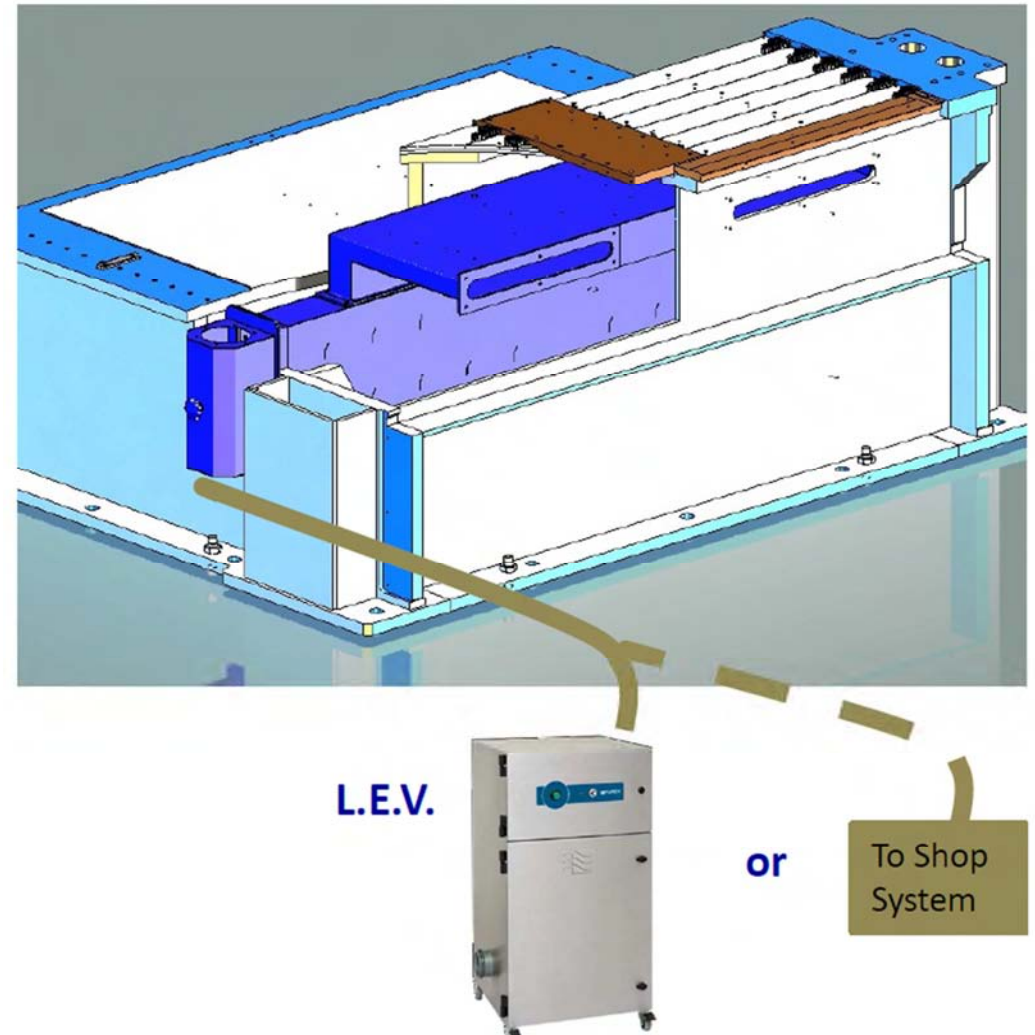
- Close loop CNC axis control for precise sheet length accuracy & realtime verification of actual material movement
- Non-contact based methods:
- Laser Surface Velocimeter - LSVs Reliability & consistency
- Commercially available components
- Optical/Vision System Higher resolution/accuracy
- Configured system



LASER CUTTING MODULE

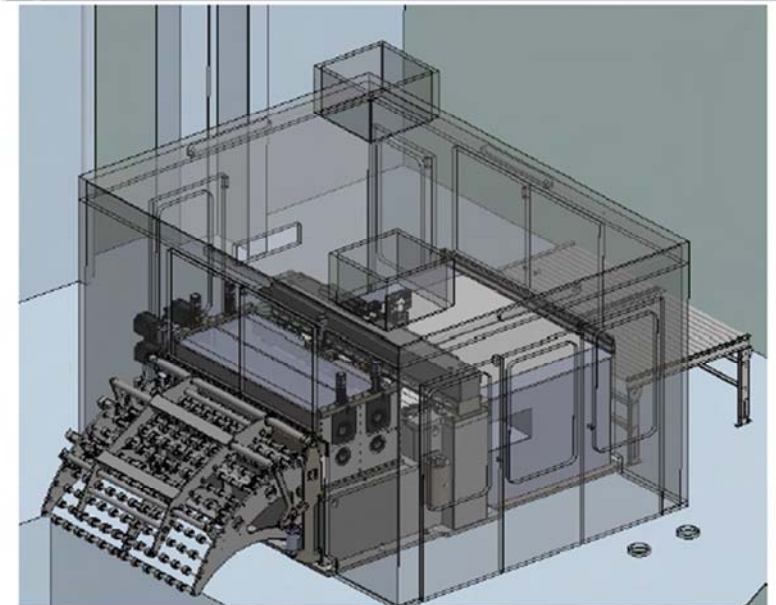
Fume handling system:

- System integrated into base weldment
- Internal exhaust
- External exhaust
- Easily maintained
- Scrap conveyor used to remove large pieces.



SAFETY SYSTEMS

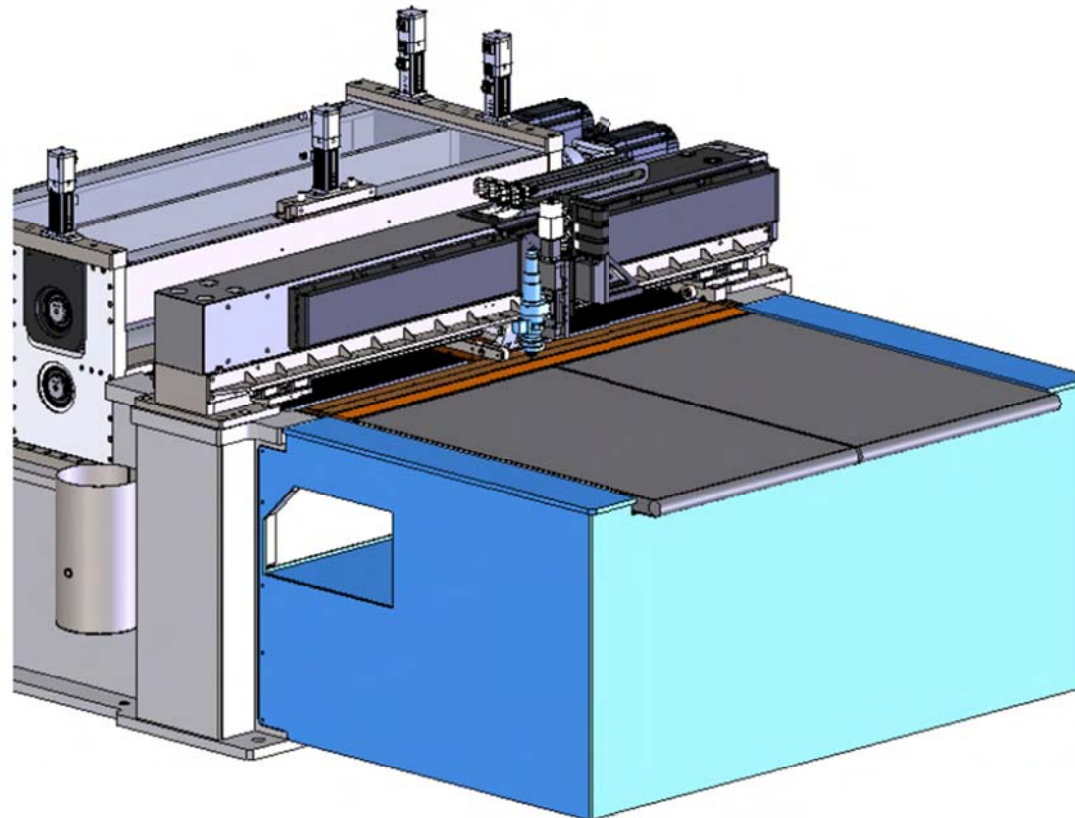
- “Class I” Enclosure
- Design based on fiber laser beam intensity
- Control measures determined by
ANSI Z136.1 and IEC 60825



LASER CUTTING MODULE

Prime/Scrap removal

- **Powered conveyor removes prime parts and keeps laser continually cutting.**
- **Scrap door enables side-out scrap handling.**
- **System fully integrated and CNC controlled.**

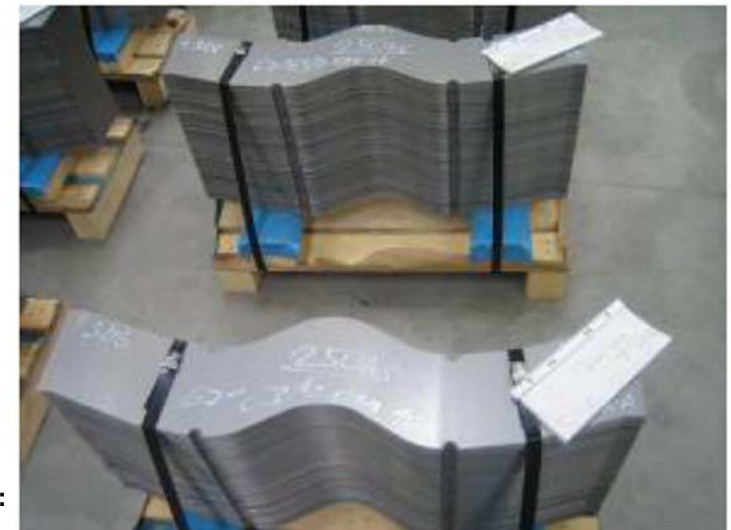




Coil Fed Laser Blanking Systems

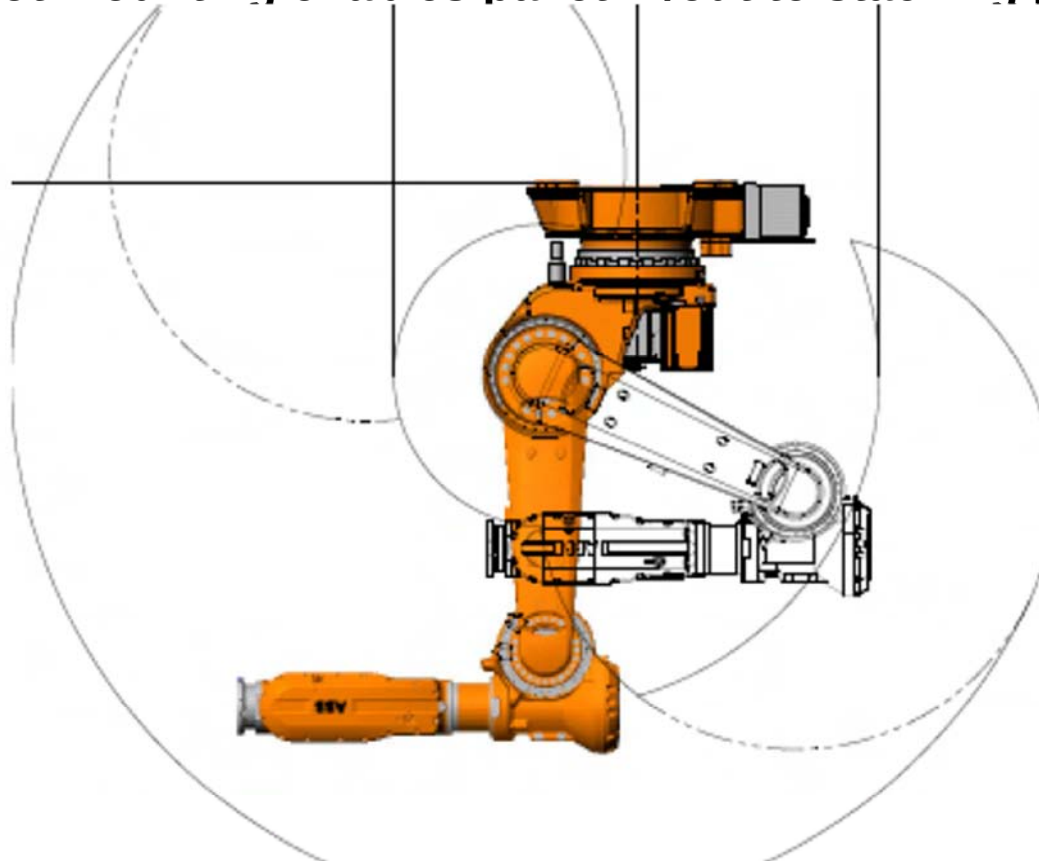
PRIME PART HANDLING

- Magnetic or Vacuum stacking
- Robotic stacking
- Gantry
- Articulated
- Flipper stacker



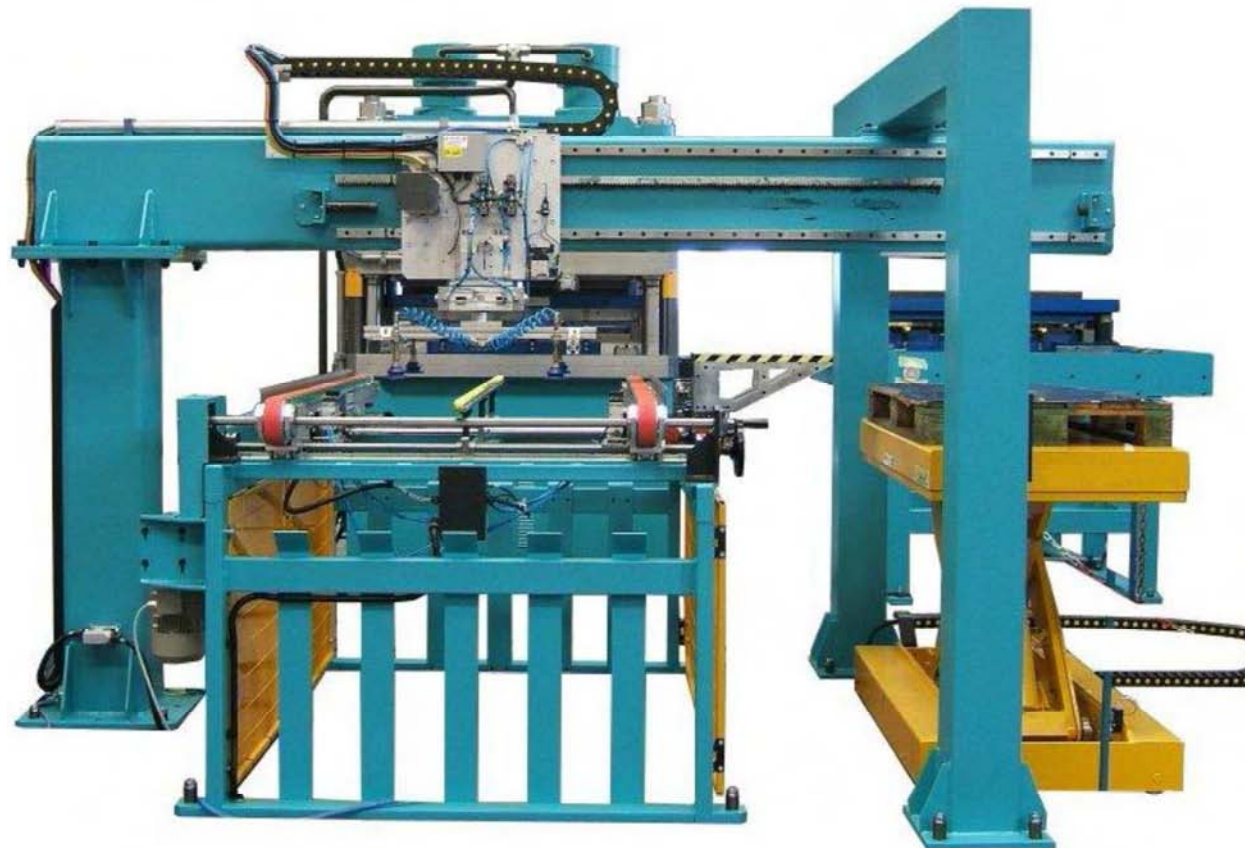
PRIME PART DUAL ROBOTIC

- Utilize dual articulated robots for cycle times less than 5-7 seconds
- Dual robots enable stacking of Offal nested parts
- Conveyor System enables load/unload of pallets/prime parts
- Inverted robot mounting enables pallet in/out to stacking position



PRIME PART GANTRY ROBOT

- Pick and place gantry stacker
- Stacking speeds for 10 seconds or greater



SCRAP AND OFFAL HANDLING

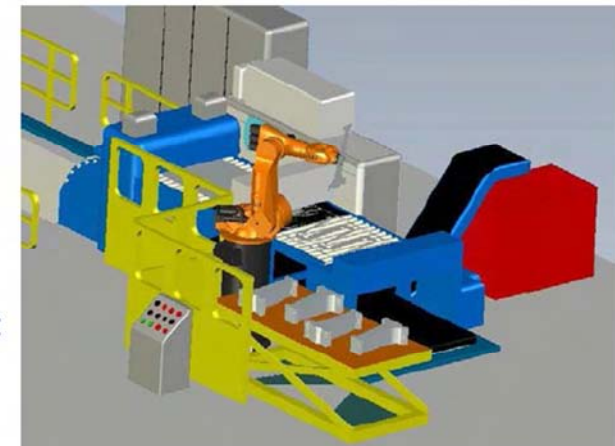
- Cutting in one plane enables scrap handling similar to traditional blanking/stamping press
- Trap door-bottom drop, eject side out
- Robot removal – for large scrap or offal



Scrap door closed

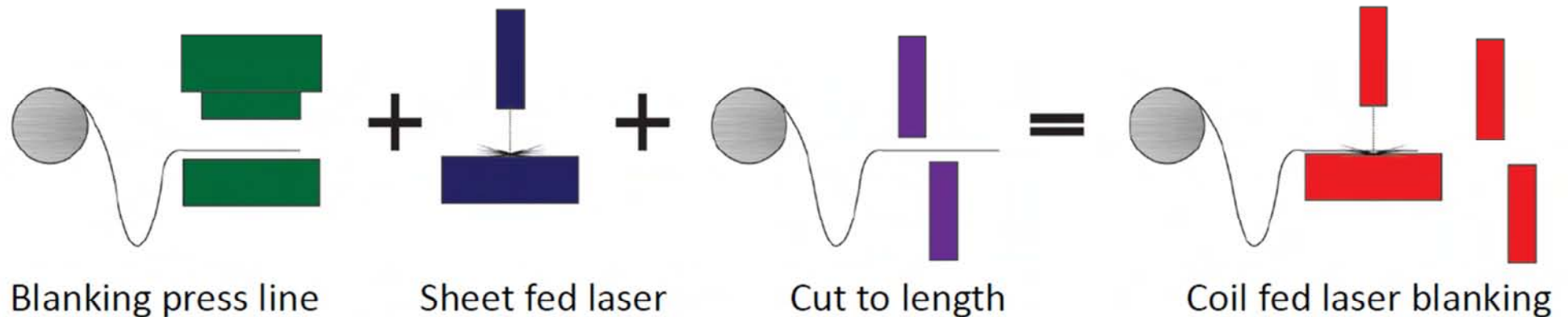


Scrap door open



Offal-robotic

3 LINES INTO 1



SUMMARY OF BENEFITS

- Lower cost per part (equipment, no dies and die maintenance)
- Optimized part nesting results in less scrap
- Immediate change of part geometry vs. hard tooling die
- Flexible production, blanks or sheared parts
- Quick changer over, change from part to part with a button
- Improved profitability through a range of production rates