METALIX
ROMANIA

The Metalix Sheet Metal Processing System

From design to finished part: cutting, punching, bending
and production management

JobTrack • CAD Link • cncKad • AutoNest • MBend

OVERVIEW

System modules

A single platform covers the whole chain: design, programming, quoting and production tracking.

Design

CAD Link

The link to 3D CAD software: exports the assembly and automatically creates the 2D flat patterns.

Sheet and tube cutting programming

cncKad + AutoNest

NC programs for laser, plasma, water-jet, punching and router; automatic nesting on real stock.

Press brake programming

MBend

Tooling, bend sequence, the NC program for the controller and the final flat pattern.

Quoting

JobTrack

Quotes created from parts or products, with calculated data transferable to the ERP.

Process management

JobTrack

Orders, scheduling, machine reporting, stock; all in one SQL database.

Core principle: every part is registered once, and every later step works with the same data.

OVERVIEW

The workflow at a glance

All data is managed in the JobTrack SQL database: from quoting and ordering to the cut and bent part, with the option of also tracking subsequent operations.



1 Register parts

From 3D CAD, products, quotes or cutting orders

2 Program machines

Automatic nesting and NC program generation

3 Sheet stock

Standard sheets and reusable remnants

4 Machine scheduling

Driven by the cutting due date

5 Machine reporting

Start/Stop from the operator terminal

6 Reports and ERP integration

AutoNest, JobTrack and ERP data exchange

Registering parts (1/2): from 3D CAD and from products

1 From 3D design, through CAD Link

- Works with SolidWorks, Solid Edge, Inventor, PTC Creo and Tekla
- The assembly is exported and the 2D flat patterns (as well as the CAM files for tubes) needed for cutting are created automatically
- A CSV file is then generated with: product (assembly) name, client, part names, quantity, material and thickness
- The file is imported into JobTrack, and all this data is registered as a **Product** (product tree)

2 By creating a Product

- Useful when work is managed by product, even if the parts do not come from a 3D model
- Part files are added, selected from the folders that contain them
- Recorded: product name, client, parts, quantity, material and thickness
- Products become the basis for quotes and orders: whole products are loaded, with all their data, instead of individual parts

Result: fully defined products, reusable in quotes and orders.

Registering parts (2/2): quotes and cutting orders

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3 Quotes (optional)

- Recorded: client, quote date, parts, quantity, material and thickness
- A quote can be created directly from existing Products

4 Cutting orders

- Recorded: client, date, **cutting due date**, parts, quantity, material and thickness
- An order can be created directly from existing Products

Supported file types: nc, nc1, nc4, nc12, dxf, dwg, cdl, cmc, cp, scpx; optionally 3D files such as IGES and STEP.

After this step there are registered cutting orders, and **everything that follows is linked to the data in these orders**.

Machine programming: efficient work plans

One programming environment for laser, plasma, water-jet, punching, router and other machines.

Parts come straight from the order lists

- NC programs are created starting from the parts in the orders
- Filter by client, order number, cutting due date (= priority), material, thickness or part size
- Highly efficient work plans are built easily, coordinated with machine scheduling

Nesting on the sheets actually in stock

- Cutting layouts use the sheets in stock at programming time (optionally linked to the ERP)
- Reusable remnants left from partially cut sheets go back into stock
- Each remnant automatically receives an identification code

Predefined technology: Cutting Technology Tables and Part Handling

Defined once per machine / material / thickness and applied automatically by AutoCut and AutoPunch.

Cutting Technology Tables

- Cutting conditions: speeds, piercing times, kerf, gases
- Lead-in (approach) length and type, per entity size
- Corner treatment: rounding and corner loops
- Corner slow-down distance and much more

Part Handling tables

- MicroJoint positions
- Stops and hole slicing (so large hole scrap cannot tilt)
- Micro-welds
- Not handling (parts with no special treatment)

Multi-material daily jobs, easy to fine-tune

Default results can be changed quickly whenever needed.

Daily job organization

- A daily job can contain several materials and thicknesses
- They can be run separately or all together

Overriding the automatic result

- Add, edit or delete MicroJoints and lead-ins
- Change lead-in length and part positions

Cutting sequence on the sheet

- Several options for the order of parts and of holes inside parts
- **Cooling distance**: minimizes sheet deformation during cutting
- Automatic cutting of the leftover skeleton

One click to finish programming

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A SINGLE BUTTON

Send to production

- Generates the NC programs
- Creates all job and order reports
- Closes programming on one, several or all machines at once
- Cuts the reusable remnant, returns it to stock and engraves its code, material, thickness and outer dimensions

Based on default settings defined up front.

Reports cover the whole cutting process

- Exact part dimensions (perimeter / area)
- Cutting times per part and per program
- Net and gross weight (including unusable scrap)
- Geometry, code, weight and size of reusable remnants returned to stock

Punching (1/3): automatic application of tools to parts with AutoPunch

cncKad turns CAD files into NC code for punch machines, fully automatically or with full manual control over every step.

Automatic tool selection

- Tools are chosen from the Tools Library using predefined rules
- Criteria: preferred tools, fewest tool changes and turret rotations, MicroJoints, material and thickness
- The proposed tools can be changed as needed; punch warnings and limits are displayed

All parameters in one place

- Crunching on notches and holes
- Part handling, predefined shapes, MicroJoints
- Slitting and special processing, e.g. for very large or very small round or polygonal holes
- Default settings especially useful when tapping or bevelling are used often

MicroJoints and WireJoints: placed automatically or manually, based on the Part Handling table (size, minimum number, spacing, preferred position). Offsets can be set and edited, and joints can be deleted, shown or hidden.

Source: metalix.net, cncKad Punching pages

Punching (2/3): the sheet, the turret and special tools

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Automatic repositioning

- When parts exceed the table range, the sheet is repositioned automatically
- Sheets larger than the working range can be processed

Clamp protection

- The post-processor calculates repositions, tool size and dead zones
- The program avoids damaging the clamps

Processing modes

- In stripes, part by part or with common cuts
- Automatic indexing and sheet trimming

Part handling for punching

- MicroJoints
- Unloading through a chute
- Vacuum pick-up
- Turret setup customization

Special and advanced tools

- Forming and tapping
- Wheel tools and marking
- Deburring
- Common cuts even with special tools

Source: metalix.net, cncKad Punching pages

Punching (3/3): advanced technologies

Fully automatic by default, yet easy to control manually.

1 Tool path optimization

Sets the starting corner, the path, the stripe width and the distance between two successive hits (to avoid stressing the sheet), per tool or globally.

2 Minimum tool rotation

On auto-index stations the hits are ordered so the station rotates as little as possible, reducing machine wear.

3 Common cuts and trim

Adjoining parts share a single tool pass. The skeleton can be crunched automatically, leaving very little scrap.

4 Stripes

The sheet is processed one stripe at a time, greatly reducing collisions and distortion on thick or heavy sheets.

Punching in AutoNest

- Nesting according to turret restrictions (number and size of stations, auto-index) to avoid unnecessary tool changes
- Tools and MicroJoints can be edited directly in AutoNest, for the whole nest or for single parts
- Punch + laser/plasma combination machines: tools are applied to parts automatically and parts are nested with common cuts

Source: metalix.net, cncKad and AutoNest pages

STEP 3 | STOCK

Sheet stock: programs based on what is in the shop

Standard sheets

Regular formats such as 3000x1500, 2000x1000 or 6000x2000.

Reusable remnants

Rectangular or irregular leftovers from partially cut sheets. Their code is created automatically when programs are generated, and they are added to stock at the same time.

When **AutoNest** runs, it calls up the stock for each material/thickness pair in the daily job. Sheet formats can be chosen in three ways:

Automatic

The algorithms pick formats based on the resulting efficiency.

Manual

The programmer selects one or more preferred formats.

Priority order

Formats are used in a set order, for example remnants first, then full standard sheets.

All stock movements are recorded in the JobTrack SQL database and can be linked to the ERP.

STEP 4 | SCHEDULING

Scheduling programs on machines

The **cutting due date** on each order is one of the most important data points in organizing production. It is used twice:

1. When creating programs

- Parts are pulled from orders into daily jobs according to their due date
- Programs are therefore created in the right order

2. When scheduling machines

- The list of SubNests (NC programs) to schedule has an **Earliest due date** column
- It shows the closest due date among all parts in the SubNest
- SubNests are scheduled on a calendar, per machine, by this date, material/thickness and duration

STEP 5 | EXECUTION

Reporting cutting from the shop floor

Each operator has a JobTrack Terminal on a computer next to the machine.

01

Check the schedule for the planned day and time

02

Find the program and load it on the machine

03

Start cutting and press **Start** in the scheduler

04

Press **Stop** when the program is done

What JobTrack records

Start begins timing the actual cutting duration. Stop marks every part in the program as **cut** in the database, so order status is always current.

Three levels of reporting

AutoNest reports

For the machine operator

- One report per SubNest (NC program)
- NC program name, material/thickness, number of runs, machine, duration, programmer
- Per part: name, material/thickness, order/client, quantity in daily job and in SubNest, weight, area

JobTrack reports

Limited only by the data entered

- Products, quotes, orders, due dates
- Parts quoted, ordered, nested, programmed, scheduled and cut
- Sheet consumption (formats, weight, area) per product, quote or order
- All stock management reports

ERP integration

Two-way data exchange

- Tools to link with the ERP for any data transfer
- Since it runs on SQL, all JobTrack data can feed further reports and integrations

STEP 6 | INTEGRATION

Integrating JobTrack with the ERP

Data	How it works	Direction
Products	Created easily in JobTrack by importing from folders	JobTrack > ERP
Quotes	Calculated data can be transferred	JobTrack > ERP
Orders	Recommended: create the order in the ERP; saving it automatically creates the cutting order in JobTrack	ERP > JobTrack
Sheet receipts	Incoming sheets are transferred into JobTrack stock	ERP > JobTrack
Sheet usage	Consumption of sheets is reported back	JobTrack > ERP
Remnants	Sent when generated, or as end-of-period stock, as preferred	JobTrack > ERP

MBend: press brake programming

MBend can be used in two ways, depending on how integrated the process should be.

1 Option 1: tooling and bend sequencing

- 3D parts are transferred from design to MBend
- MBend selects the tooling and calculates a collision-free bend sequence
- The setup report, the NC program for the controller and the flat pattern are produced automatically
- Minimal programming time

2 Option 2: integration into the whole system

- The 3D assembly is exported to MBend through CAD Link
- Batch Processing of all parts
- The final flat pattern, created with the real machine parameters
- The whole bending process is managed and tracked in JobTrack

Option 1: tooling and bend sequencing, part by part

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3D part from design → Unfolding in MBend → Tooling and bend sequence → **Automatic outputs**

1 Setup report

All the information the operator needs to set up the tooling and bend the part.

2 NC program

Generated for import into the machine controller to produce the part.

3 Flat pattern

Produced automatically together with the bending program, ready for cutting.

Advantage: all three outputs are produced automatically, with minimal programming time.

Option 2: bending integrated into the programming system

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Automatic part preparation

- Through CAD Link, the 3D assembly is exported to MBend
- Each part with bends is generated as a separate MBCAM file
- For parts without bends, the CAM files for cutting are generated in the same process

Batch Processing

- All parts are processed automatically in a single batch
- Each part gets a setup report, an NC program and a flat pattern (the CAM file for cutting)

Why it matters: the flat pattern is the final one

- The flat pattern is created with the MBend parameters, set by the user through tests on the machine
- Parts are unfolded using tool-specific bend compensation tables, giving precise blank dimensions
- The blank cut on the laser or punch is the one that bends correctly on the press brake

STEP 7 | BENDING

The bending process, managed in JobTrack

Through the link with JobTrack, bending follows the same tracked workflow as cutting.

1. Design
2. Assembly transfer to MBend
3. Product in JobTrack
4. Order in JobTrack
5. Batch Processing from orders
6. Machine scheduling
7. Machine reporting (Start/Stop)

What you gain

- Full traceability, from the 3D model to the bent part
- Bending programs created automatically, straight from orders

The same tools as for cutting

- Machine scheduling and Start/Stop reporting at the press brake
- Bending data goes into the same SQL database

What comes with the system

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Implementation package

Installation, commissioning on the machine and training.

Included support and updates

Free support and updates for the period set in the contract.

Extended support

Support and updates after that period, under a separate contract.

Online first

Remote support quickly resolves most machine and software issues. On-site visits happen only when a problem cannot be solved online or presence at the machine is essential.

CONTACT

For more information

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