



SCOOP Sheet Cutting and Process Optimization
for furniture enterprises

SCOOP

OPTIMIZATION SOFTWARE



SCOOP Sheet Cutting and Process Optimization for furniture enterprises

SOFTTEL Srl General Information



Softel Srl was founded in 1990 starting from the synergies of ICT experts.

Softel is a SME located in the city of Terni (100 Km NE from Rome) in the Centre of Italy.

Activities

The main activities are referred to:

- **network systems supply**
- **custom software development,**
- **advanced Internet Services (E-Business),**
- **specific ICT training**
- **R&D project**

OPTIMIZATION SOFTWARE PRODUCTION

PROPEDEUTIC ACTIVITIES (made by RTD)

- SMEs **REAL** OPTIMIZATION NEEDS (WP1)

- OPTIMIZATION ALGORITHMS (State of the art,
different approaches) (WP 2 – 3 – 4)

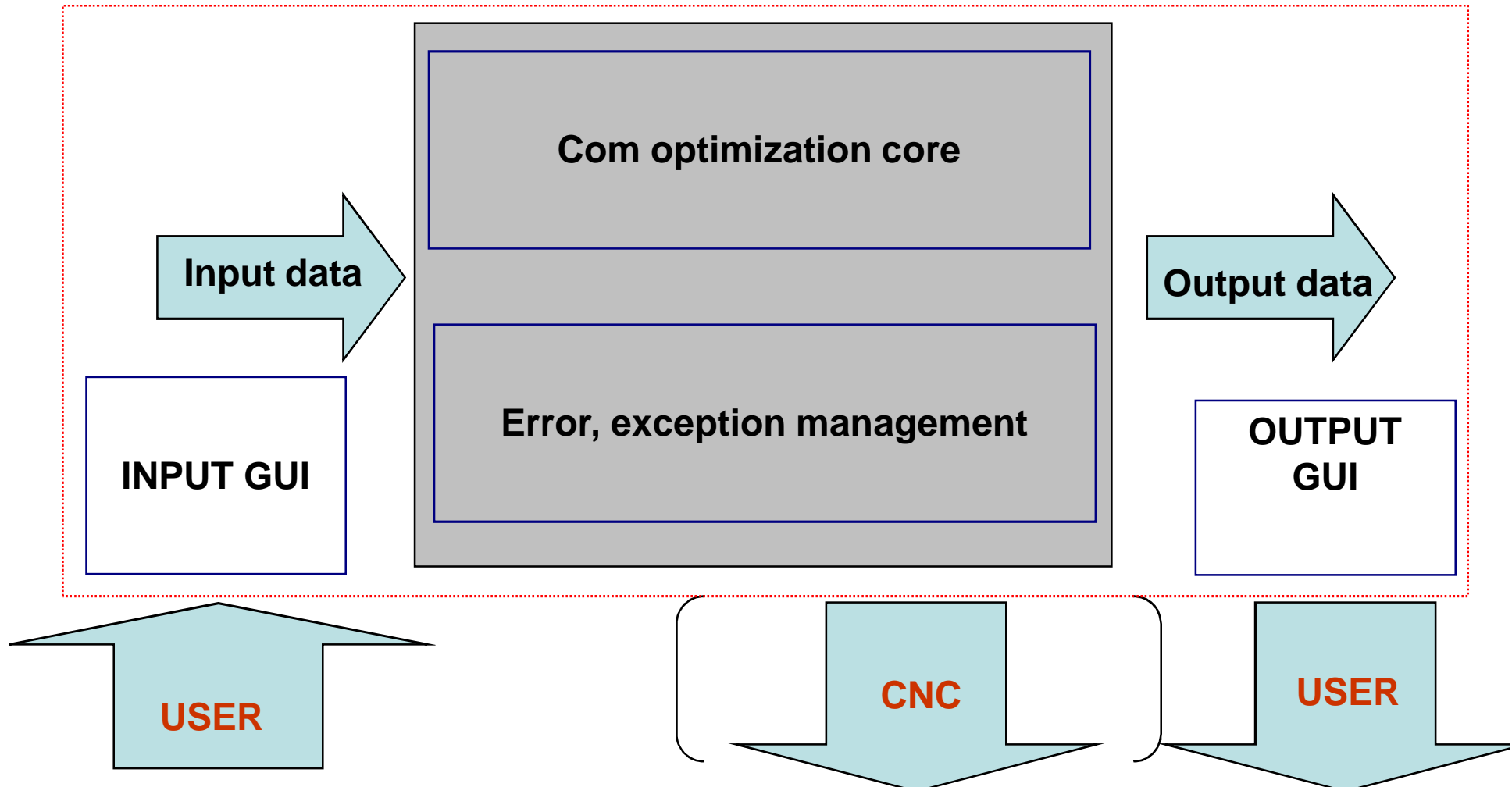
-OPTIMIZATION ALGORITHMS COMPUTATIONAL
TEST IN **REAL CASES** (using specific research
HW+SW tools) (WP 2 – 3 – 4)

-OPTIMIZATION ALGORITHMS COMPUTATIONAL
TEST IN REAL CASES (**using HW+SW tools
available in SMEs**) (WP 2 – 3 – 4)

- DLL, COM production implementing optimization
algorithms (WP 2 – 3 – 4)

OPTIMIZATION SOFTWARE PRODUCTION

Software structure



SOFTWARE BASIC FEATURES

Inputs:

- Wood panels in stock (Raw materials)
- Client orders: number of pieces per item/type to be produced
- Information on plant layout (pre-cuts)

Cutting stock:

How to cut a generic raw material in order to optimize some performances indexes (**user selectable**)

TRADE OFF?

Pattern sequencing:

How to sequence the cutting patterns, in order to optimize some performances indexes (**user selectable**)



A set of cutting patterns with the related number of repetitions



The previous set of cutting patterns differently sequenced



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SCOOP OPTIMIZATION SOFTWARE MAIN FEATURES

SCOOP Optimization Software helps woodworkers and furniture SMEs manage parts lists to **quickly** generate:

- cutting diagrams
- optimum stack matrix related to pattern sequencing.
- production reports

It combines **sequentially** both approaches of:

Cutting Stock Problem (CSP)

In terms of definition of the:

- Cutting patterns
- Raw material cost minimization

Pattern Sequencing Problem (PSP) that defines the pattern processing order optimizing performance indexes



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SCOOP OPTIMIZATION SOFTWARE MAIN FEATURES

The most important features of SCOOP Optimization Software:

- Generate optimized cutting diagrams (sequence of patterns) for ordered items
- Manage raw materials inventory.
- Store data for parts, instances, materials (everything organized in a relational database).
- Import parts lists from external list file.
- Copy/Paste to and from other programs.
- Customize user preferences for cutting optimization.



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THE EXISTING OPTIMIZATION SOFTWARE CAN TYPICALLY MANAGE:

- Infinite number of input panels and output items
- Waste minimization
- Job time minimization
- Manually editing of generated patterns
- CNC connection

BUT NOT ALWAYS HAVE:

- Simple and intuitive GUI
- Pattern sequencing features
- Efficient optimization algorithms



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SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

OPERATING FEATURES

- Manual Editing
- Parameter setting for PSP
- Evaluation of multiple patterns (Cutting Layers)
- Memory management improvements

GUI DEFINITION

- Tools/Optimization Bars updates concerning the new operating features
- Modification of input/output layouts

SERVICES

- reports
- help

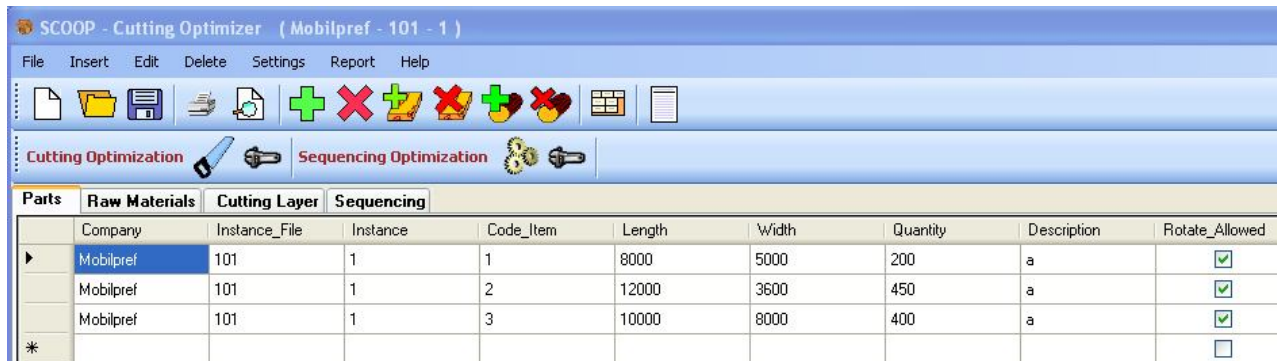
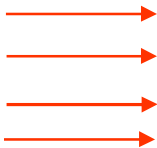


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SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

The following is the **actual** general layout of SCOOP Optimization Software.

Windows bars



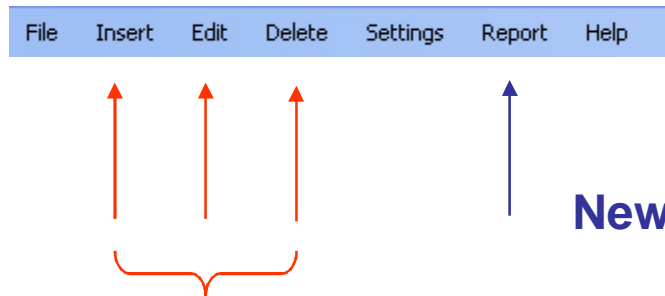


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SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

GUI CHARACTERISTIC

Actual Menu bar



for boards, instances, items, manual editing



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SCOOP OPTIMIZATION SOFTWARE LAST UPDATE

GUI CHARACTERISTIC

Tool bar



Optimization Bar



Layer Folders





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SCOOP OPTIMIZATION SOFTWARE LAST UPDATE

CSP Setting Menu

Cutting settings

Number of stages:
Choose the number of stage of cut

2 stages 2 stages with trim 3 stages 4 stages

Quality of result:
Allows to control the balance between the speed of execution and the quality fo the solution

Low High Opt

Number of different items type in each board:

 Insert the maximum number of different item types in each pattern

MaxOpenStacks:

PercentageOverProd:

Rotation:

No Yes

PreCut mode:

No Yes

Pre-cut phase direction:

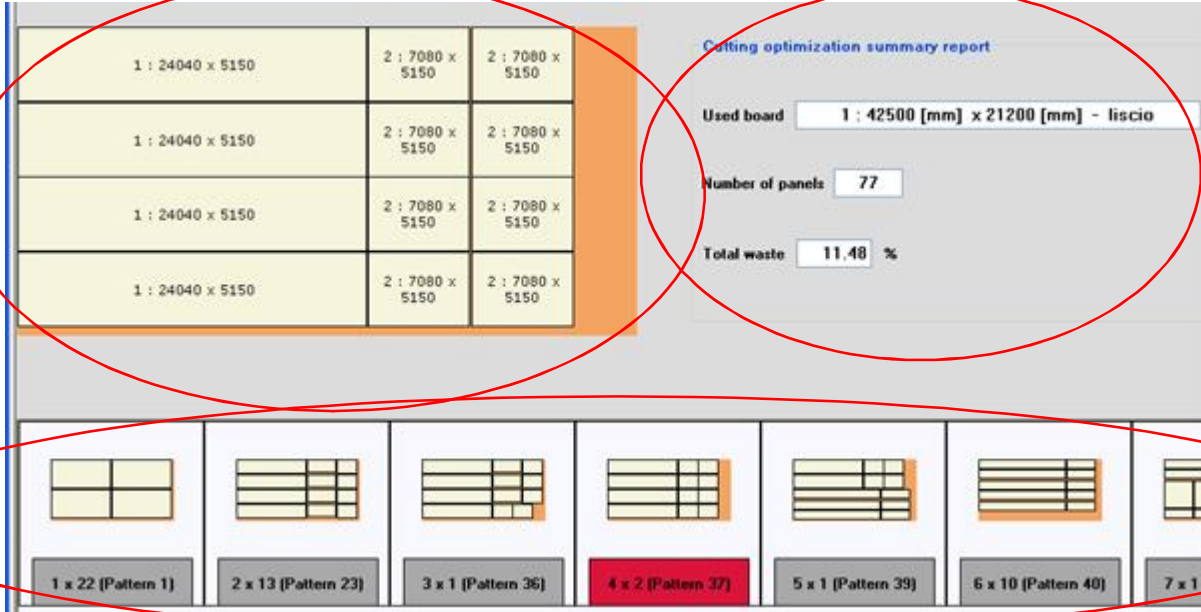
Horizontal Vertical

OK Save settings Cancel

SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

GUI DEFINITION

→ Input/Output layouts

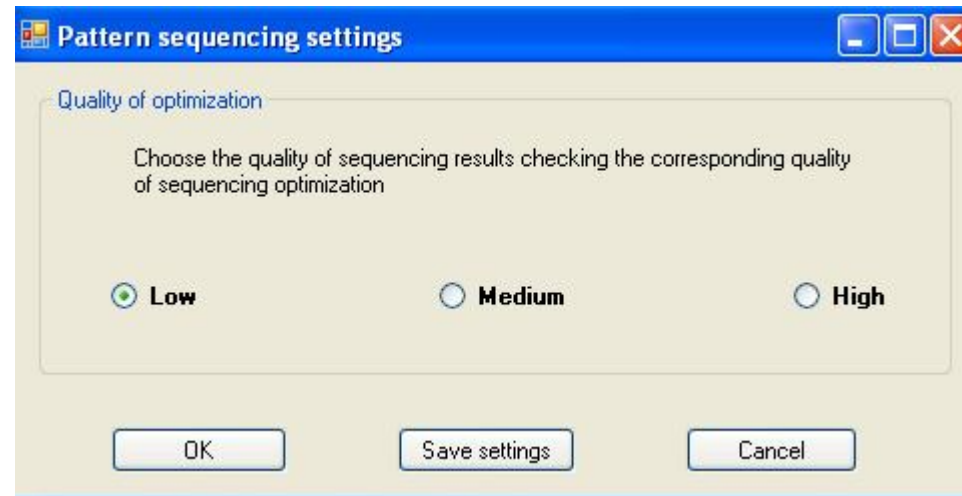


The screenshot displays the SCOOP software interface. On the left, a 'Cutting Layer Zoom' view shows a grid of panels with dimensions: 1 : 24040 x 5150, 2 : 7080 x 5150, and 2 : 7080 x 5150. On the right, the 'Cutting optimization summary report' shows: Used board 1 : 42500 [mm] x 21200 [mm] - liscio, Number of panels 77, and Total waste 11.48 %. At the bottom, a 'Scrollable selectable cutting Pattern' interface shows various patterns, with '4 x 2 (Pattern 37)' highlighted in red.

Scrollable selectable cutting Pattern

SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

OPERATING FEATURES → Parameter setting for PSP



Quality

Speed



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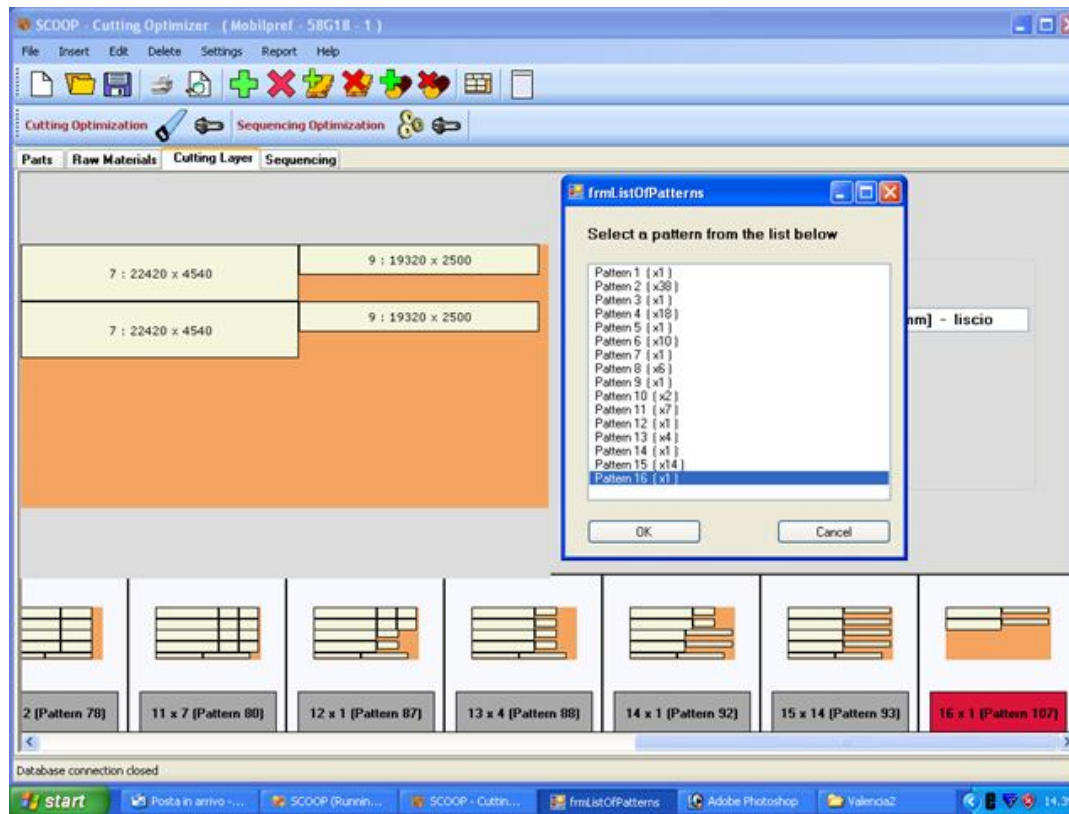
SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

OPERATING FEATURES → Production Matrix

P/I	1	2	3	4	5	6	7
1					X	X	
2					X	X	X
3		X					X
4		X		X			X
5				X			X
6	X		X	X			X
7	X		X				X
8	X						X
9	X						X
10							X

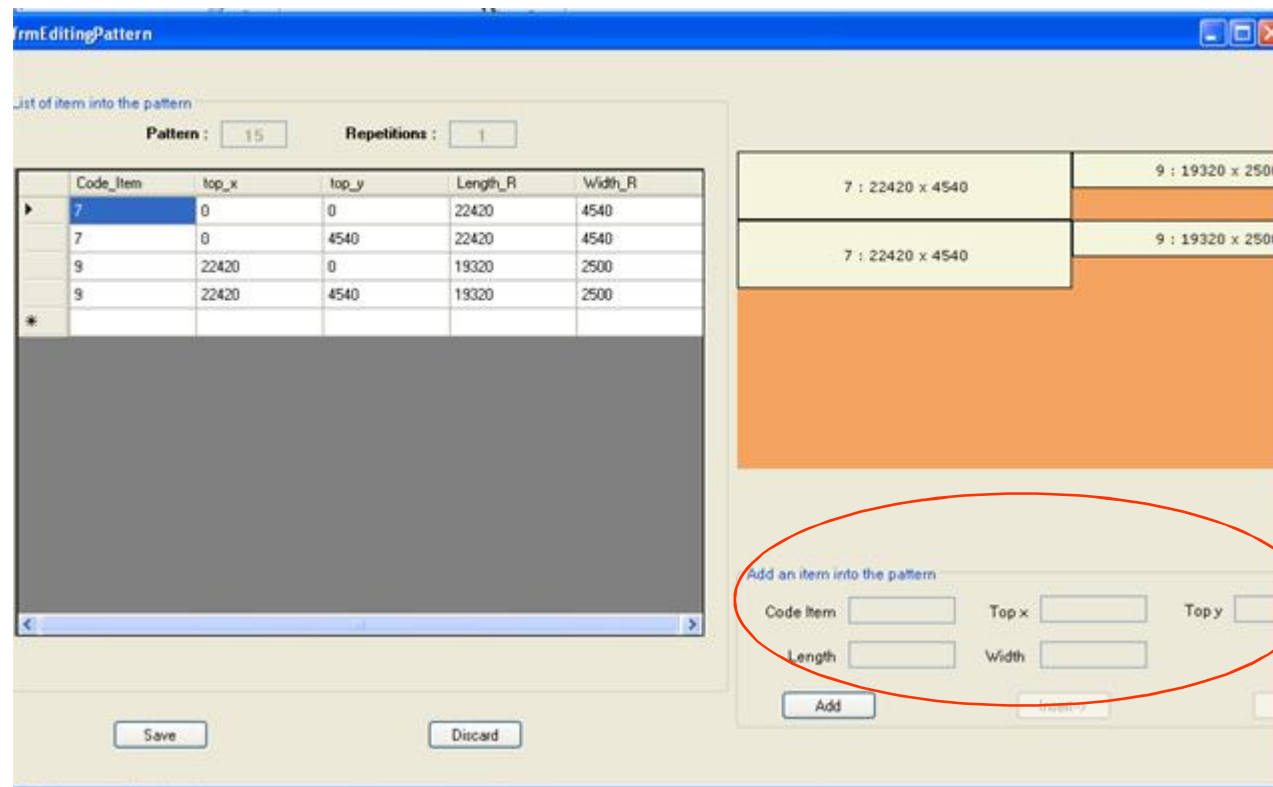
SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

OPERATING FEATURES → Manual Editing



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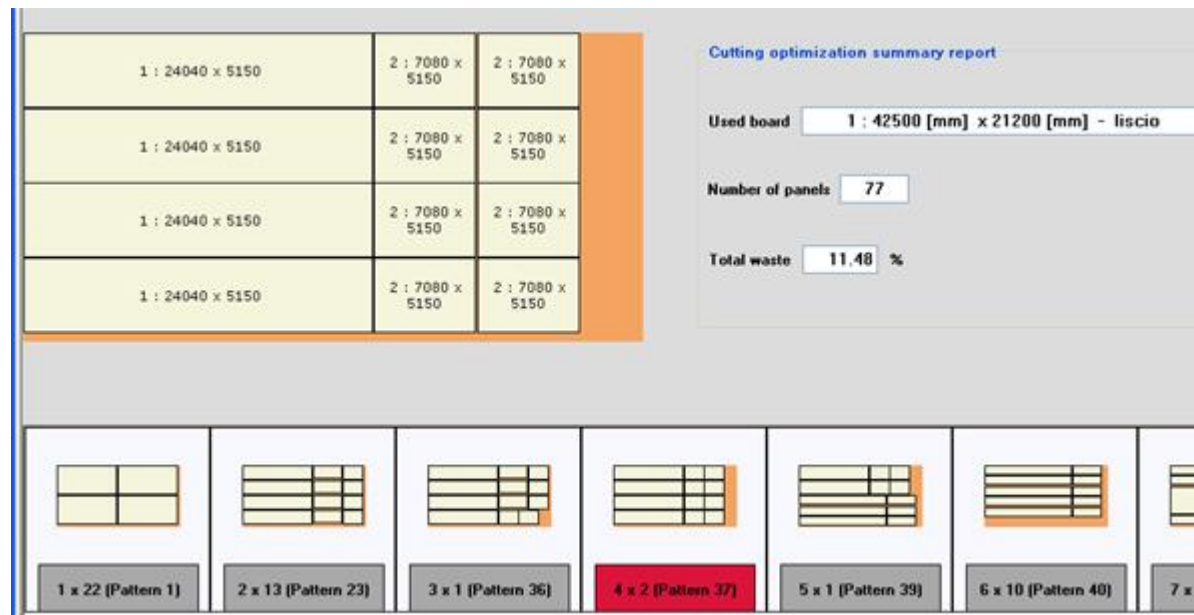
OPERATING FEATURES → Manual Editing



Manual item
insertion

SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

OPERATING FEATURES → Evaluation of multiple patterns (Cutting Layers)

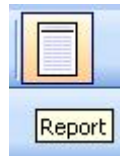
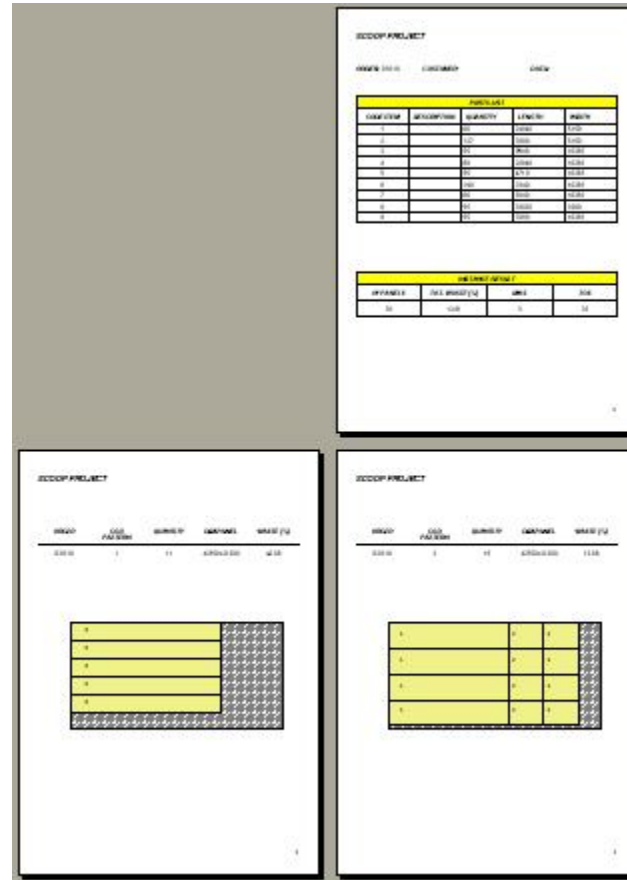


Pattern #4 is cut 2 times

SCOOP OPTIMIZATION SOFTWARE LAST UPDATES

SERVICES

→ Reports

The screenshot displays three reports from the SCOOP software. The top report is an 'Instance Summary' table with columns for 'COM CODE', 'DESCRIPTION', 'QUANTITY', 'AREA (m²)', and 'PRICE'. Below it is a smaller table with columns 'APPAREL', 'VAL. PRODUTTO', 'AREA', and 'COST'. The bottom two reports are 'Cut Lists', each showing a table with columns 'MATERIALE', 'QUANTITA', 'UNITA', 'MATERIALE', and 'QUANTITA', alongside a visual representation of a sheet layout with a grid of cut pieces.

PDF file

← Instance Summary

→ Cut List



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SCOOP OPTIMIZATION SOFTWARE

Future development and integrations

Modifications/Updates expected for the future:

Integration of closed-loop approach CSP-PSP libraries

Features for market distribution:

- Postprocessor for cutting machine direct connection

Thank You !