

SECANT for Bar Cutting



Overview

SECANT creates high yield cutting patterns to produce the parts you need from the stock bars that are available. The patterns are shown as clear diagrams or simple cut-to lists.

SECANT is frequently integrated with the clients order processing and stock management systems. A number of interfaces are available including those for database and spreadsheet software. Vendors of software systems can directly access SECANT's functions via an API.

Using SECANT

SECANT uses the familiar *menus and forms* image in its user interface. Each form supports defaulting, filtering, sorting and block editing to make data entry as fast and easy as possible. A comprehensive on-line manual and contextual help at each stage ensures rapid progress up the learning curve. The cutting list and stock file properties visible to the user can be tailored simply for each organisation. The terminology can be changed to match the industry conventions.

The user creates SECANT jobs each of which comprises a cutting list, a stock file and a set of controls. A library of jobs is maintained for rapid referral to past performance. Jobs may be entered manually, imported from other systems or created by merging standard orders.

Any precision can be used for piece and bar sizes. SECANT allows units to be given as either

metric or **imperial**. Dimensions can make use of **decimals** and **fractions**.

Pattern Building

The Objective

SECANT minimises the costs of cutting. The cutting cost includes both the **material cost** and the **handling** and **machine costs**. Cost elements include the cost of transporting bars to the cutting machines, machine set-up time, time to make a cut through each bundle of bars and the time to return offcuts pieces back to stock. Offcut costing can reflect the reduced flexibility of smaller offcut sizes.

Piece properties

SECANT generates patterns that will produce the pieces specified in the cutting list. Both **exact** requirement production and controlled **over-make** are supported. SECANT will never under-produce on the requirement. You can however specify **optional** pieces that may be cut if by so doing the yield is improved. A cutting list may contain pieces to be cut from **different cross sections**. SECANT will collate the pieces and produce a pattern set for each distinct material.

Angle Cutting

Specifying the angles: Angles may be entered explicitly into the cutting list or you may use the **graphic mitre input screen**. This dialogue allows you to view a diagram of the angled cuts as you are entering them. Angles may be

specified in degrees or as a splay. Mitre diagrams may be **printed** to accompany the order to the saw. A clear diagram showing the cross section face and angles to be cut reduces the risk of expensive errors. The mitre input screen is linked to a database of cross section sizes, dimensions, bundle sizes and symmetry indicators to simplify angle specification. The same cutting list can contain angle cuts off different faces of the section.

Mitre cutting restrictions: The SECANT controls allow you to specify any minimum or maximum angle cutting restrictions imposed by your saw along with the clamping allowances that are required when two non-complementary angles are cut. SECANT fully models the options for rotating and re-presenting the bar during angle cutting in response to saw restrictions.

Optimizing mitres: SECANT takes full account of the material savings that can result from nesting angle cuts. All orientations of the cut piece that are consistent with the total or partial symmetry of the cross section are taken into account. After optimisation clear bar cutting diagrams are available illustrating the cutting sequence and piece orientation.

Piece Handling

Work flow: The highest yields and the most efficient saw usage can generally be achieved by allowing SECANT to freely combine any of the piece sizes in the cutting list. However such patterns may result in an unacceptable amount of work in progress where at any time a

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large number of orders are partially complete.

SECANT offers a number of facilities to address these issues.

- The patterns may be constrained so that no more than a given number of pieces or a given number of **different pieces** appear in any one pattern.
- The pieces may be constrained so that the pieces are produced broadly in line with a **production schedule**.
- A limit can be placed on the number of pieces or types of piece in **progress** at any time.

Saw Capabilities: You can specify.

- Blade loss.
- Trims.
- **Clamps.**
- Maximum **bundle height**.

Ranging

Ranging is the process of **searching** for the best yield while varying the size of a stock bar. SECANT allows you to search for the ideal stock size to use with any job. You may specify the largest and smallest size along with the size increments.

Pattern Preferences

Patterns may be forced to use **open bundles** of stock bars or to complete a pack once it has been opened. Patterns may be sequenced to reduce **work in progress**.

Reporting & Labeling

Labels

Labels can be produced for each cut piece, each stack of pieces and each offcut. Label design is easy with a graphic editor that allows you to select job details, production date, production sequence, piece properties and bar properties and drag them to their printing positions on the label. Special text formats and logos can be added. All standard label sizes and custom label sizes are supported.

Reports

A library of reports is provided as standard with the SECANT package. You may add to these reports by combining SECANT's reporting blocks with your own headings and text to produce your own customised reports. Reporting blocks are available containing.

- Overall yield & timing summaries
- Pieces produced
- Material used
- Offcuts created
- Cut-to lists
- Diagram (for each pattern)
- Pieces produced (for each pattern)
- Yield summary (for each pattern)

Job History and Statistics

SECANT maintains a **register** containing a history of the jobs that have been run. One register file is created for each month. These files are maintained by SECANT in a form compatible with standard spreadsheet software so that a monthly analysis of performance can be performed. If the stock updating

facility is being used then the register of jobs is automatic. A record is written into the register when stock is assigned to the job and this record is replaced when the job is complete and the stocks are updated. If the stock updating facility is not being used then you may explicitly register a job. When the first entry is made into the registry for any month a new register file is created and all records for incomplete jobs are copied forward from the previous month. In this way the register for a month will always contain a record of all jobs completed in that month plus all work in progress in that month.

The register contains an exhaustive record of the performance of each job, the pieces produced, material used, stock length used, waste, offcuts, number of cuts, cutting times, etc.

Stock/Offcut Management

The efficient management of offcuts is an important element in any bar cutting operation. SECANT costs both the use and the creation of offcuts so as to keep offcut stocks to manageable levels.

SECANT provides a simple stock management system for users who do not already operate an external stock handling system.

- Stocks may be maintained in a library of files.
- Stocks may be entered, modified and deleted.
- Stocks may be reserved to a future job.
- Stocks may be automatically updated for the material used by a job and the offcuts created by that job.
- Stock files may be filtered to show only those items that meet stated criteria (i.e. item

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of a given specification that exceed given dimensions). Sales staff may use the SECANT stock screens when accepting orders.

Contact information

If you have any further questions or would like to arrange for a demonstration then please contact us at the address given below, or visit our website at www.pslopt.co.uk.

Integration

Developers wishing to integrate the SECANT engine with their own software should refer to the **Integrators Guide** available from the downloads section at www.pslopt.co.uk for details of the SECANT DLL library, the LINUX engine and the command line options.

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Each SECANT job is a collection of simple ASCII comma separated files. Options are available to import the cutting list and stock file that define a job from spreadsheet software or from SQL databases.

SECANT can also be run in a batch or server mode. Folders are scanned for jobs that are then processed automatically according to a script. This approach can be used to add an optimizing capability to web-based ordering systems or other third party sales order systems.

Versions

Versions of SECANT are available for the single workstations (Windows 2000/NT/XP) for networked users and for terminal servers. A Linux version provides the optimization and reporting facilities as command line driven executables.

