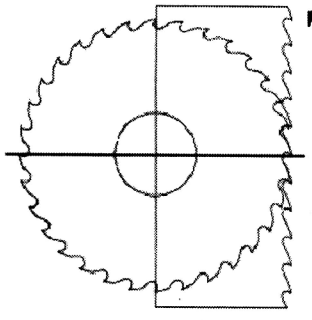
SawSel

Splined Circular Saw Selection Program



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About This Program

How the program works Profits in sawmilling depend on making good choices about everything that affects yield, production rate, and quality. Saw selection is critical to this.

SawSel is a computer simulation that explores options for a range of operating factors such as feed speed, plate thickness, critical speed, load index, kerf and operating horse power.It is a tool to help you to analyse the effects of changing these specifications. SawSel incorporates mill experience and technical data for factors that are known to influence the dynamics of sawing.

Use ***SawSel*** to help balance your present operations; to optimise yield, production rate and quality at your mill now.....Then, test " WHAT IFS"...to fine tune your system or to plan for change.

Who can use the program?

- The program has been developed for :
- MANAGERS, to look at options, if kerf and target sizes are changed.
- SAW FILERS, to compare existing saw selection with alternatives.
- QUALITY CONTROL, to monitor mill sawing practises.

Getting started

The program runs on a 386 or 486 computer that takes a 3.5" disc drive, runs DOS software and has a color monitor .

START UP
Install the disc in the appropriate disc drive.
Type A:or B: Type TKT Press ENTER

There will be a brief registration message.

PLEASE NOTE THAT REGISTRATION IS FOR A SINGLE MILL AND IS CODED AS SUCH. MULTIPLE USER LICENCES FOR A COMPANY ARE AVAILABLE AT SUBSTANTIAL DISCOUNTS.

TUTORIAL

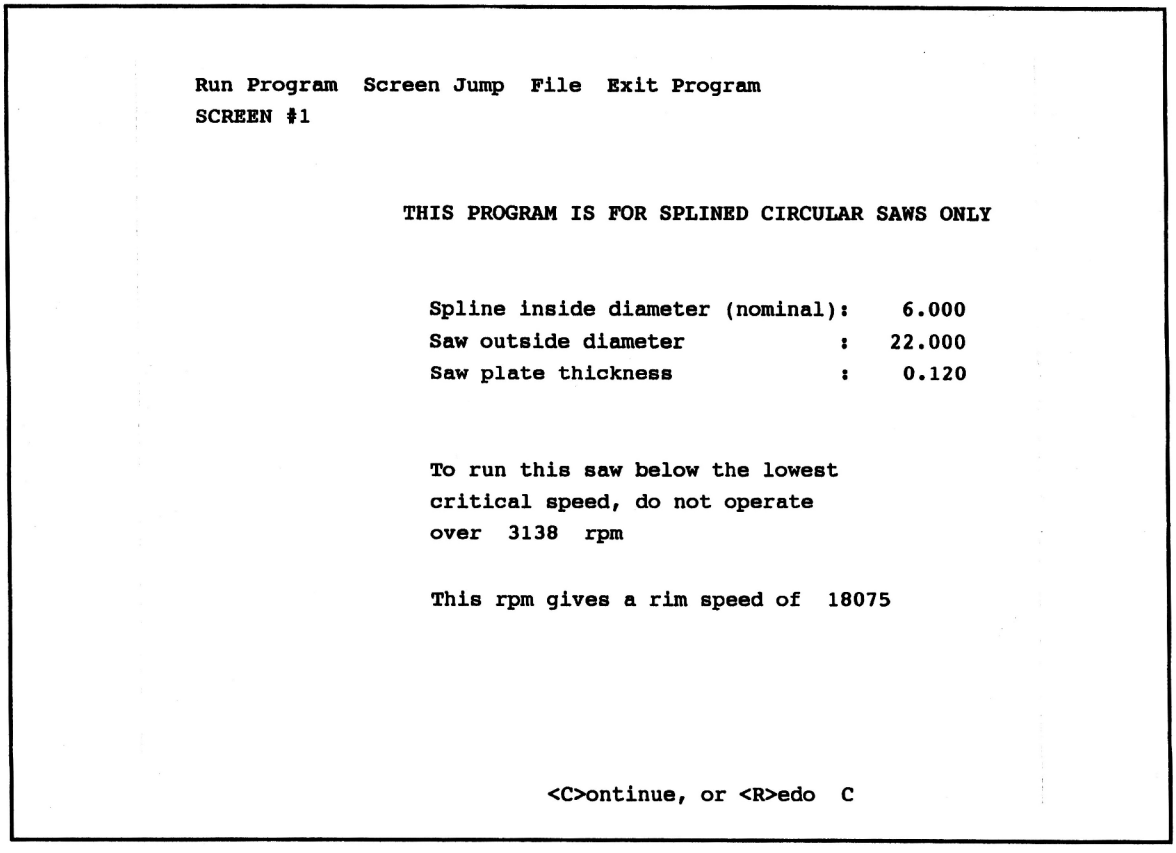
This tutorial is based on an EXAMPLE of a saw selection program.

THESE DATA AND THE SCREEN PRINT OUT VALUES SHOWN ARE FOR DEMONSTRATION ONLY

Saw diameter .....22 in.
Spline diameter..... 6 in. (# 3 spline)
Saw plate thickness..... 0.120 in.
Maximum depth of cut..... 6.00 in.
Minimum depth of cut..... 2.00 in.
Kerf width..... 0.160 in.
Feed speed..... 450 fpm
Wood species..... North American softwoods.

SCREEN # 1

With the floppy disc in the correct drive.....type TKT.
Press ENTER and the first working screen will appear as shown below....Input data for the example



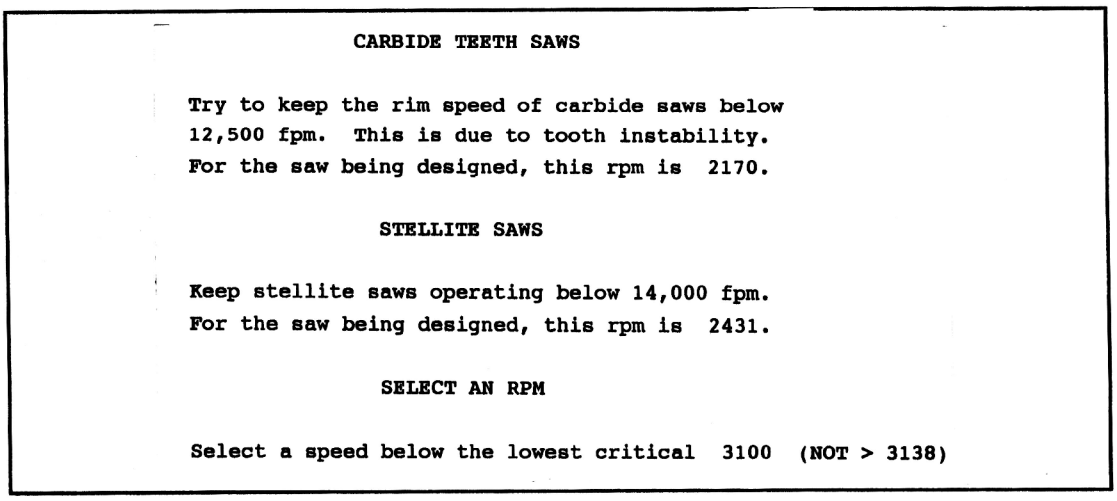
CRITICAL SPEEDS:

This program calculates a speed in RPM that is about15% below the most dominant critical speed. The Critical speed is that at which the saw naturally wants to vibrate and has poor stiffness. You will not wish to run at a faster speed than is calculated here..

SCREEN # 2

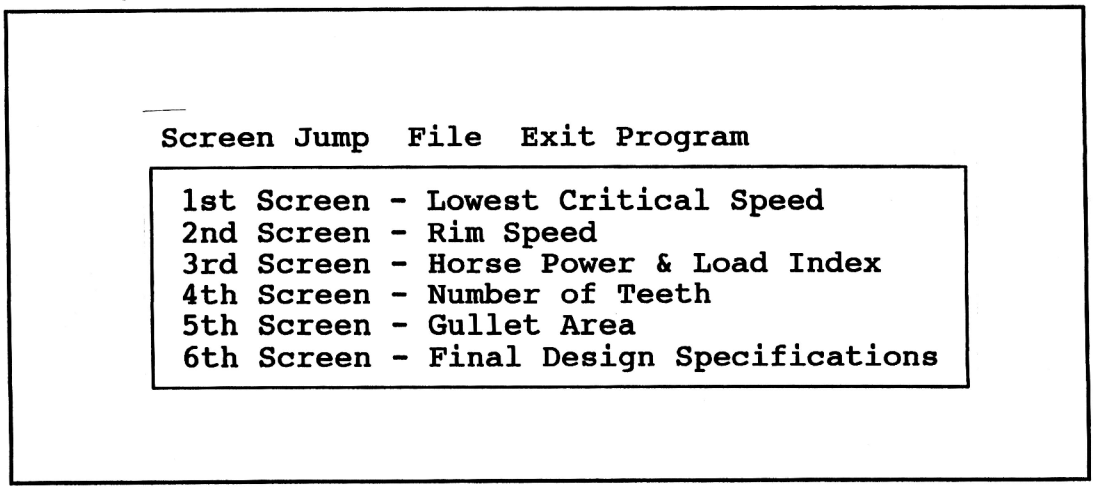
RPM SELECTION

This screen deals with the selection of an RPM for carbide saws, or stellite saws. Whichever you select, the final RPM must be kept below the lowest critical speed.
The screen is shown below.
Enter your RPM selection at the flashing cursor.
For the example shown,, enter 3100. The maximum suggested for the saw is 3138 RPM



NOTE:

To return to a previous screen, press ALT on your key pad . Use the directional tab keys to select " Screen Jump" from the pull down menu. Select 1st Screen and enter. The pull down menu will look like this :



SUGGESTION :

THIS WOULD BE A GOOD TIME TO BECOME FAMILIAR WITH ALL THE PULL DOWN MENU FUNCTIONS.

SCREEN # 3

HORSE POWER AND LOAD INDEX CALCULATIONS.

Press <C > to continue.
Enter the data at the flashing cursor as follows:
IN THE EXAMPLE

For maximum depth of cut enter 6.00
For minimum depth of cut enter 2.00
For kerf width enter 0.160
For feed speed at max. depth of cut enter 450

The screen reads out:

```
Run Program  Screen Jump  File  Exit Program
SCREEN #3



                        HORSE POWER CALCULATIONS

          Enter the maximum depth of cut (in inches)   :     6.000
          Enter the minimum depth of cut (in inches)   :     2.000
          Enter the kerf width (in inches)             :     0.160

      Enter the feed speed relative to maximum depth of cut:   450.000
                    The cutting Horse Power is  105.000
```

The Horse Power read out is 105 h.p.. Remember that this is for one saw line only and is calculated at 35h.p./ft specific cutting energy
The program gives a brief description of LOAD INDEX and displays the calculated figure In the example the Load Index is 0.3713 which indicates that the selections chosen have been conservative.
Cutting accuracy should be good.

SCREEN # 3 Press <C> to continue.

```
                              LOAD INDEX

The load index is a saw stiffness indicator.  The program calculates how the
saw will cut given the data entered. If the Load Index exceeds  0.8  the saw
is NOT stiff enough to cut accurately.  Either slow the feed speed, increase
the rpm, or reduce the kerf.  Load index is  0.3713


                        <C>ontinue, or <R>edo  C
```

SCREEN #4 (cont'd)

NUMBER OF TEETH

The program incorporates suggested bite/tooth ranges for both carbide and stellite teeth.
The bite/tooth which is the most efficient is 0.038" . The program calculates the number of teeth required to achieve this figure and. prompts the user to enter the number of teeth needed,(rounded off to an whole number). IN THE EXAMPLE enter 44 teeth for this saw selection. The program suggested 46, but the example will show that the program is flexible and will display the bite/tooth for any number of teeth entered.

The program then confirms that the bite/tooth should and does exceed the side clearance . **If this is not the case, the text flashes as a warning.**

Tooth spacing is calculated based on the number of teeth.

The number of teeth that are in the smallest depth of cut is displayed. It is always desirable to have more than one tooth in the cut during this process to avoid vibration.

Press <C> to continue

SCREEN # 4

```
                    CALCULATE THE NUMBER OF TEETH

Where bite/tooth range = 0.025 up to 0.055 for carbide teeth
and  bite/tooth range  = 0.025 up to 0.075 for stellite, the
best bite/tooth range is 0.038

To achieve a 0.038" bite/tooth for saw being designed, the
number of teeth is 46
Select and enter the number of teeth rounded to an even number   44

Check Bite/Tooth is  0.040     The side clearance is  0.020

 NOTE: The bite/tooth should (and does) exceed side clearance.

Tooth spacing is  1.571     (Keep above 1" and not over 4")

There are  1.273  teeth in the wood at the minimum depth of cut.

                    <C>ontinue, or <R>edo  C
```

GULLET AREA.

This screen shows the principles used to calculate the gullet area required.

SCREEN # 5

SCREEN #5

GULLET AREA

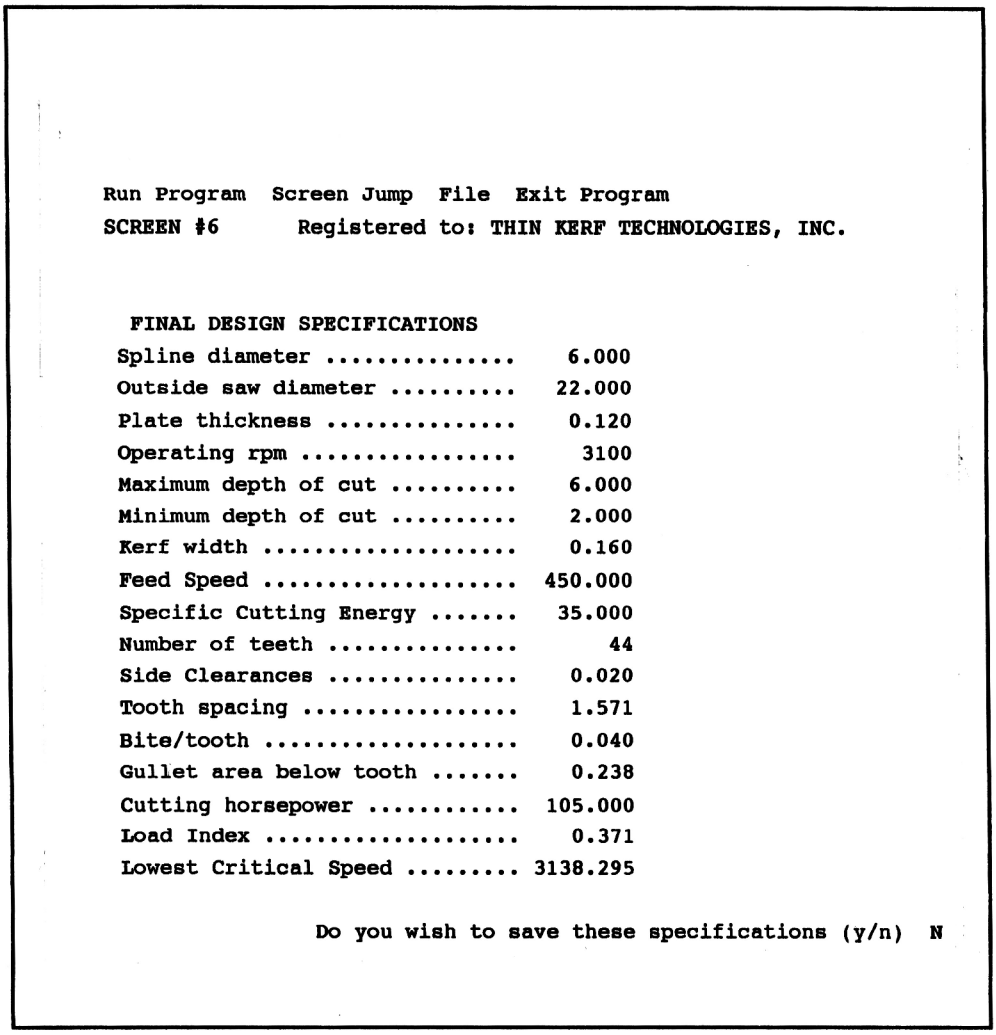
The Program works with a gullet feed index of 0.3. This is the ratio of solid wood removed to the gullet area available. The gullet area available is the area below the tooth.

The area below the tooth that is required is 0.238 sq.inches.

FINAL DESIGN SPECIFICATIONS

This screen displays all the final design specifications.

SCREEN 6



Run Program Screen Jump File Exit Program
SCREEN #6 Registered to: THIN KERF TECHNOLOGIES, INC.

FINAL DESIGN SPECIFICATIONS

Spline diameter	6.000
Outside saw diameter	22.000
Plate thickness	0.120
Operating rpm	3100
Maximum depth of cut	6.000
Minimum depth of cut	2.000
Kerf width	0.160
Feed Speed	450.000
Specific Cutting Energy	35.000
Number of teeth	44
Side Clearances	0.020
Tooth spacing	1.571
Bite/tooth	0.040
Gullet area below tooth	0.238
Cutting horsepower	105.000
Load Index	0.371
Lowest Critical Speed	3138.295

Do you wish to save these specifications (y/n) N

SCREEN # 6 (CONT) Print these specifications or....... Press any key to continue.

The new screen prompts to either "SAVE" the information by typing y(yes) or not to save by N(no) .

FOR THE EXAMPLE ASSUME YES: The output is:

```
Run Program  Screen Jump  File  Exit Program
SCREEN #6      Registered to: THIN KERF TECHNOLOGIES, INC.


 FINAL DESIGN SPECIFICATIONS
Spline diameter ..............    6.000
Outside saw diameter .........   22.000
Plate thÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜ Save Data ÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜ
OperatinÜ                                                  Ü
Maximum Ü                                                  Ü
Minimum Ü                                                  Ü
Kerf widÜ                       Save as:                   Ü
Feed SpeÜ                                                  Ü
SpecificÜ          TEST COPY                               Ü
Number oÜ                                                  Ü
Side CleÜ                                                  Ü
Tooth spÜ                                                  Ü
Bite/tooÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜ
Gullet area below tooth .......    0.238
Cutting horsepower ............  105.000
Load Index ....................    0.371
Lowest Critical Speed ......... 3138.295
```

To save these values,enter a file name
The screen now prompts you to decide if you want to run a parallel set of calculations. Type Y
Do you want # 1 or # 2 alternate? Type 1

THE PROGRAM NOW ALLOWS A REVIEW OF THE EARLIER SPECIFICATIONS AND PERMITS CHANGES TO BE MADE........HERE YOU CAN TEST IDEAS ABOUT "WHAT IF" BEFORE SETTING UP PRODUCTION RUNS IN THE MILL..

For example, try a thinner plate and kerf width for this application. Use the down arrow to reveal cells: The RPM cell is a different color because the calculation defaults to the lowest critical speed for the new data input. ....Type Y to cycle cursor and for the example, enter the value 2615 for operating RPM.

Enter data changing the kerf width to 0.140 in and plate thickness to 0.100inThe next different color cell describes the number of teeth

The program automatically defaults to a number of teeth which will give a 0.038" bite/tooth. Here, enter 54.

The load index printout confirms that the system is still within range. These changes are practical options to try.

The new screen is shown below.

```
Run Program  Screen Jump  File  Exit Program
SCREEN #6      Registered to: THIN KERF TECHNOLOGIES, INC.

 FINAL DESIGN SPECIFICATIONS                Alt.Calc.#1      Alt.Calc.#2
Spline diameter ..............    6.000          6.000
Outside saw diameter .........   22.000         22.000
Plate thickness ..............    0.120          0.100
Operating rpm ................     3100           2615
Maximum depth of cut .........    6.000          6.000
Minimum depth of cut .........    2.000          2.000
Kerf width ...................    0.160          0.140
Feed Speed ...................  450.000        450.000
Specific Cutting Energy ......   35.000         35.000
Number of teeth ..............       44             54
Side Clearances ..............    0.020          0.020
Tooth spacing ................    1.571          1.279
Bite/tooth ...................    0.040          0.038
Gullet area below tooth ......    0.238          0.240
Cutting horsepower ...........  105.000         91.875
Load Index ...................    0.371          0.665
Lowest Critical Speed ......... 3138.295       2615.245

                Cycle through the values again (y/n)?  N
```

Make further adjustments by changing values as you wish.
The format for Alternate # 2 can be used to compare specification changes.AS AN EXAMPLE .....set the plate thickness even lower at 0.095" while keeping the same kerf.Reduce operating RPM to 2400 with side clearance at 0.022.....assess the readout.

The output screen shows that with the changes that were made the load index tolerance has been exceeded and is more than 0.8. These specifications would not allow the saw to cut accurately and should not be used..

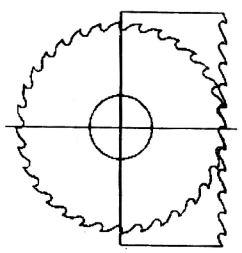
```
Run Program  Screen Jump  File  Exit Program
SCREEN #6       Registered to: THIN KERF TECHNOLOGIES, INC.
```

FINAL DESIGN SPECIFICATIONS		Alt.Calc.#1	Alt.Calc.#2
Spline diameter	6.000	6.000	6.000
Outside saw diameter	22.000	22.000	22.000
Plate thickness	0.120	0.100	0.095
Operating rpm	3100	2615	2400
Maximum depth of cut	6.000	6.000	6.000
Minimum depth of cut	2.000	2.000	2.000
Kerf width	0.160	0.140	0.140
Feed Speed	450.000	450.000	450.000
Specific Cutting Energy	35.000	35.000	35.000
Number of teeth	44	54	58
Side Clearances	0.020	0.020	0.022
Tooth spacing	1.571	1.279	1.191
Bite/tooth	0.040	0.038	0.038
Gullet area below tooth	0.238	0.240	0.257
Cutting horsepower	105.000	91.875	91.875
Load Index	0.371	0.665	0.845
Lowest Critical Speed	3138.295	2615.245	2484.483

```
Cycle through the values again (y/n)?  N
```

We trust you will find this program to be practical and helpful

If you have any problems or need help, please contact us at:



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