RKnot BUILDER
or
Regular Knot Builder
VERSION 3

How to use it

With appendix for Version higher than V3.1.0.8 added at the end of the document

CONTENTS

REGULAR KNOTS BUILDER (RKBuilder ©) USER's TIPS

REGULAR KNOTS (RK) are defined as:
Single strand knots made on a **Turk's head** (THK) **cordage route** (or **shadow** - topological term -. The shadow is the knot diagram *without* any indication of the nature of the crossings existing in it). When the nature, OVER / UNDER, of the crossings is added then "the coding" of the knot is also added.

THK *are but only one very special* **type of RK** with a strictly alternating coding OVER-UNDER (UNDER-OVER).

Any knot *not* having this coding even if using a THK cordage route is NOT A THK.(this essential point seems ignored by 99.9%).

WHAT RKBuilder CAN DO :
it will do the coding of each **HALF-PERIOD** in *any* **SINGLE STRAND** knot WHATEVER ITS **TYPE OF CODING** as long as it is made on a THK shadow or cordage route. (see shadow in annexe).

It will also give you the **ENLARGEMENT** of a THK entered plus the THK from which this entered THK can be made, its **ROOT** knot.

WHAT RKBuilder DOES NOT DO :
it will not do knots that are ***not*** Regular Knots in Schaake's perspective. Does not do multi-strand for example.

PRE-REQUISITE:

- knowing about the different **TYPE OF CODING** and what that entails.

- not confusing between a THK and other knots made on a THK cordage route but using another coding than the strict O1 – U1 (or U1 – O1) of the THK, knowing those knots and the particularities that make each quite different from the other. Of course one can use this program without knowing that ; to make use of a French expression: just as ' a savant monkey" can do and still produce knots.

- not confusing between the two different frames of reference: **vertical cylinder** or **horizontal mandrel** and the consequences of this choice upon the appellation of the **TYPE OF CODING** in each frame of reference. If you happen to be not quite clear about that read SCHAAKE or **shorter way see t**he T**urk's Head pages** at :
http://tinyurl.com/38mrcp
or if you are shy of using a tiny url directly then at the preview :
http://preview.tinyurl.com/38mrcp

- knowing what a **PIN-STEP** is and the use of **PINS NUMBERS** when making a knot.

- having no trouble making a knot using the coding for each of the **HALF-PERIOD** in it (HP : see annexe for Half Period definition).

HOPED FOR BUT NOT FULLY NECESSARY HERE
(many 'dimensions' of knots will be given but not knowing what they apply to it will be of no great use to you : just use the program as a "recipe giver" and see the Half-Period coding only).
- knowing how to calculate PIN-STEPS to get the number of LEADS specifically wanted with a given Number of BIGHTS.
  - knowing about Delta* and ($-L_{\text{modulus B}}$), Delta and ($L_{\text{modulus B}}$)
  - knowing about complementary and periodic or cyclic BIGHT - number schemes
  - making no confusion between BIGHT- Index Number and BIGHT - Number

As much as humanly possible **RKBuilder**© has been made fool-proof (It has been extensively tested on XP / VISTA / WIN-7).

IN PAGE 30 YOU HAVE THE " **I WANT TO USE IT IMMEDIATELY TO JUDGE IT IMMEDIATELY** ".

VISUAL DESCRIPTION OF RKnot Builder

There exist a number of TOOL-TIPS that open when the mouse pointer is kept over a field or label.

MENU AND TOOLS BAR

MENU
[Files] / Fichiers

[Edition] / Edition

[Tools] / Outils

[Knots] / Nœuds

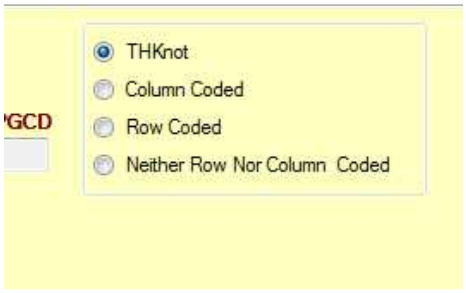
[Help] / Aide

Explore the different options in **MENU** : mostly they are self-explanatory.

TOOLBAR
The icons just under the **MENU** bar.

TABS
CREATION (Création) ----------

*** First choice to be made is the **TYPE OF CODING** among FOUR AVAILABLE (see annexe for type of coding) using radio buttons.



- **THKnot** they are Column AND Row Coded, computable using only Columns

- **Column Coded** (THK are included but why use that as you have a THKnot option without any obligation to enter a coding. ALL THK *and ONLY* THK have the strict OVER ONE / UNDER ONE coding).

- **Row Coded** (ALL of them, whether they are *with or without* a **REPEAT** of a sub-pattern. The Schaake's slide-rule can do only the **Row-Coded** with a **REPEAT**).

- **Neither Column Nor Row Coded**

DEPENDING upon that choice:

- **THKnot** = no entry field will appear as the THK O1-U1 code is in-built in the program. O1 stand for 'crossing Over time 1' and U for 'crossing Under time 1'.

- **Column-Coded** = a field will open in which you will have to enter the (**L-1**)(that means LEADS-1; just as 2*B means BIGHTS time 2) crossings as they can be seen on the **Half-Period Number ONE** in the **FINISHED** knot reading it from **LEFT** to **RIGHT** (as with any ODD-numbered HP).

By the way: do you see the picture of a knot in the upper right side corner ? This picture will change with each start of the application and you can also change it by over flying it with the mouse pointer (no need to hover).

ABBREVIATIONS USED :

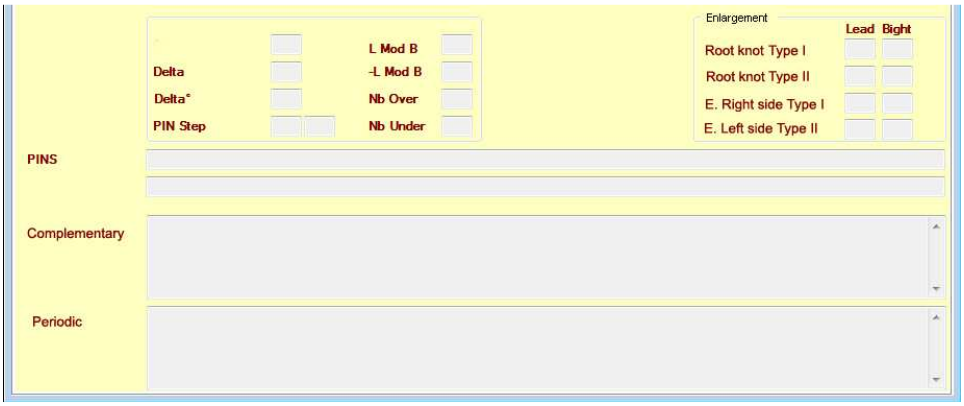
L will stand for **LEADS** so (**L-1**) means **Number of LEADS minus ONE**
B will stand for **BIGHTS** so (**B*2**) means **Number of BIGHTS time 2**

- **Row-coded** = a field will open in which you will have to enter the **Row Coding** of the knot. Entering is done following a special manner and order: the chain of the first crossing at the extreme **LEFT** side of each ROW.

- **Neither Column - Nor Row** = a button will send you to the tag appropriate for the entry of the **full matrix** of the knot.

*** Second choice to be done : **ENTER Number of LEADS and Number of BIGHTS** complying with the **GCD rule** (PGCD for French). The **GCD** will be printed on screen : if **L** and **B** do not comply with the rule the entry will be rejected. Each entry is to be validated by **[ENTER].**

If **L & B** entries are accepted then all the fields that were in light grey colour get digits written in them : they are the results of automated calculations (they are helpful if you want to study Schaake and Turner's writing and allow you to do some paper and pencil decoding).



The program works using them.

*** Once the field (if any) where to **seed the code** has been written **using only '0', '1' and 'space'** (any other character will be rejected) has been validated by **[ENTER]** or by using the button **{CALCULATION}** / CALCUL the other **TABS** can be accessed, they contain the calculation results.

Entries for code may be, say for example:
00011100 or 0 0 0 1 1 1 0 0 or 0 00 11 10 0
The program formats it after validation by **[ENTER]** and then prints it on screen as
0 - 0 - 0 - 1 - 1 - 1 - 0 - 0

Of course there are **constraints to comply with for the 'seed code' entries :**
- **(L-1)** crossings for the HP1 of the Column-Coded,
- **(2*B)** crossings for the Row-coded ,
- a matrix of **(L-1) Columns by (2*B) Rows** for the Neither-Nor-Coded

Once again = there are tools-tips available as reminder of those constraints.

DATAGRID (Grille des données) ----------
The content of this tab is to be used by the program itself not by user it is standardized so as to be « EXPORTED » in a **.TXT** file using **[Files] {Save As}** (Fichiers suivi d'Enregistrer). It summarizes the whole knot.

DATAGRID1 (Grille des données_1) ----------
The LABEL of THIS TAB CHANGES after **CALCULATION** and becomes **xL yB** according to the numbers entered for **L** (LEADS) and **B** (BIGHTS)

There you have all the HALF-PERIODS in the knot entered with their CODE.

EDITION (Edition) ----------
This tab allows you to put on the screen only one HALF-PERIOD at a time (while having easy access to *Before* and *Next* HALF-PERIODS)

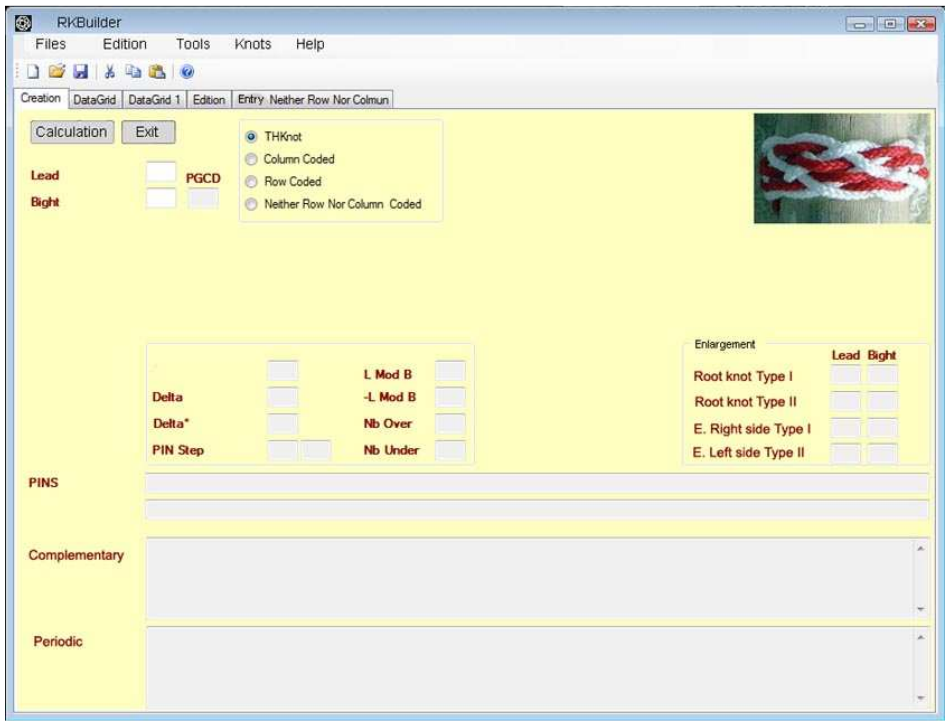
NEITHER COLUMN - NOR ROW ENTRIES (Saisie de NI Colonne Ni Rang) -----
This one is for entering the full **matrix** of **Neither Column Nor Row – Coded** knots.

NOTE : that, in fact, there is here, in hiding, a FACTOTUM or **JACK-of-ALL-TRADES**. If you enter correctly the matrix of **ANY REGULAR KNOT** whatever its TYPE OF CODING you will get a correct calculation of each and every HALF-PERIODS in it.

FUNCTIONNAL DESCRIPTION

Now more about 'how does that work or how is it to be used'

Curtains open on the:



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CREATION tab----------

All entries (except for the matrix) are done here and most of the essential calculations (save the individual HP codes) are printed on screen in this tab.

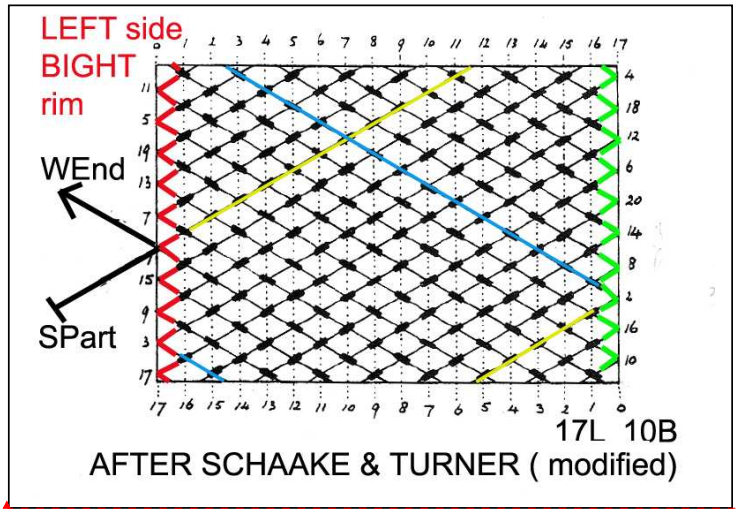
As shown in the next illustration you see available 'tool tips' when you 'hover over' the fields having a white background, those white fields are for user. (the fields with the blue grey background are for the application to use, not for user)

*** pushing the command button |**Calculation**| (Calcul) will launch the calculation of the HALF-PERIODS (H-P's or HPs). Calculation is also launched by validating with **[ENTER].**

*** pushing the command button |**Exit**| (Quitter) will close the application, which can also be done with **[Fichier]{Quitter}**

*** The use of the set of radio buttons for choosing the **TYPE OF CODING** is fairly immediate and intuitive.

Using the framed set of radio buttons select your choice of **TYPE OF CODING** (see ANNEXE if you are not fully aware of those types)
The **FRAME OF REFERENCE** for the appellation of the **TYPE** is Schaake's : the **HORIZONTAL MANDREL** with a **Bight rim** (or border, or frontier) on the **LEFT** side and a **Bight rim** on the **RIGHT** side such as in this diagram taken from Schaake.
Note: the HP-1 in yellow ; all ODD-numbered HPs go from **LEFT** to **RIGHT** and the HP-2 (HP2) in blue (EVEN-numbered HPs go from **RIGHT** to **LEFT**).



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*** The fields where the **LEADS** and **BIGHTS** numbers for the knot are to be entered are in the upper left corner.
Each entry must be validated by [**ENTER**].

When the Number of **BIGHTS** is validated (after Number of **LEADS** has been validated) a control of the **GCD** rule is applied. **GCD** / PGCD is given in the field next to the Number of **BIGHTS** field.

If there is no problem with the **GCD** then all calculations are done and printed on screen in the appropriate fields in this tab.

*** You *may not* access the field where you write the seed code before **L and B** entries have been validated by **[ENTER]** and controlled for compliance with **GCD**.

IN **Creation (Création)** ANY ENTRY IN ANY FIELD MUST BE VALIDATED BY **[ENTER]** PLEASE NO MOUSE CLICK.(Computer Mouse is for moves or selections in this program)

Choice THKnot ----------
No entry field will open for the code. THK code O1-U1 or 1o-1u (respectively U1-O1…) is in-built.

Choice Column-Coded ----------

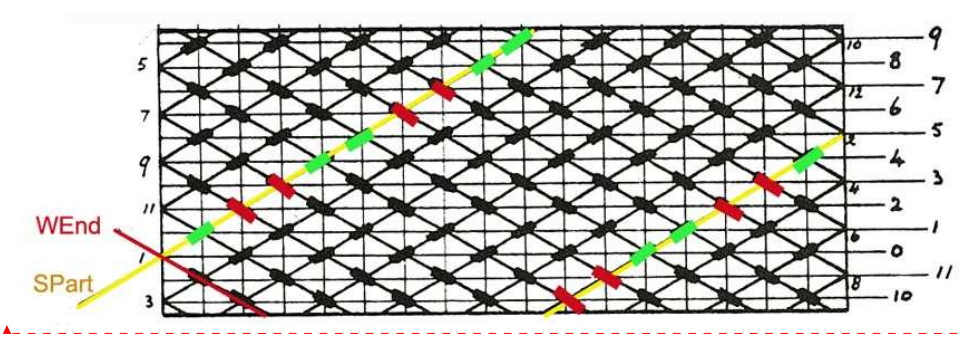
Enter the sequence of crossings seen on the HP1 of the *finished* knot (or on the *complete* grid diagram of thereof) as read by the **SPart-WEnd vector** (Standing Part / Dormant and Working End / Courant).

HP1 starts on the LOWER **LEFT** side (of the horizontal mandrel diagram for Schaake), at the crossing between SPart (Standing Part / Dormant) and goes UPPER **RIGHT** to the other Bight rim.
There are (**L – 1**) crossings to be noted.
The type of crossing is as 'read' by the HP1 *vector* or HP1 directional arrow.

Don't make too short an entry as it will be rejected ; if it is too long it will be shortened to the correct size (**L – 1**) by amputation on the rightmost entries.

ALWAYS CHECK THE FORMATED ENTRY THE PROGRAM PUTS ON SCREEN AFTER **[ENTER].** Application does not make mistakes here but YOU may have made one.

IT IS ABSOLUTELY NECESSARY TO USE, EITHER BY DIRECT TYPING OR BY CUT/COPY AND PASTE (from a .txt file) ONLY DIGIT '0' DIGIT '1' and ' SPACE' IN THE CODE FIELD



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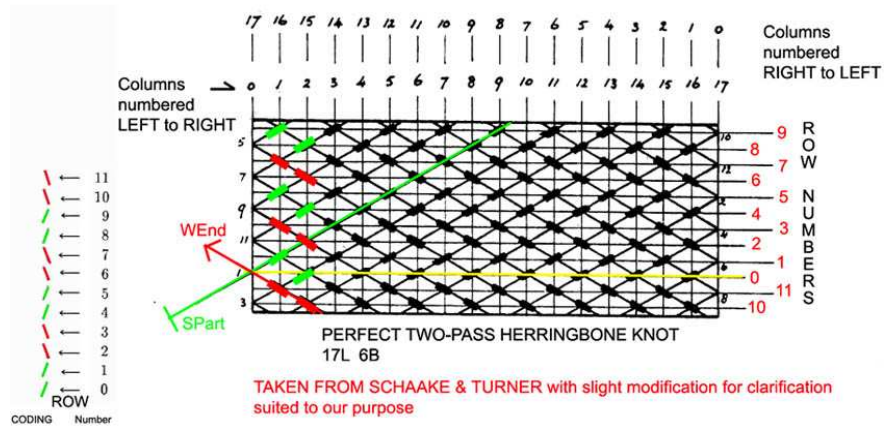
Choice Row-Coded ----------

In the same conditions that you entered the HP1 ('0', '1' and 'space' only , complying this time with the adequate length of 2*B) you will need to enter the **Row-Coding**. The HP1 code corresponds to 1001100110011001

The **Row-Coding** is the coding of EACH row in the *finished* knot.



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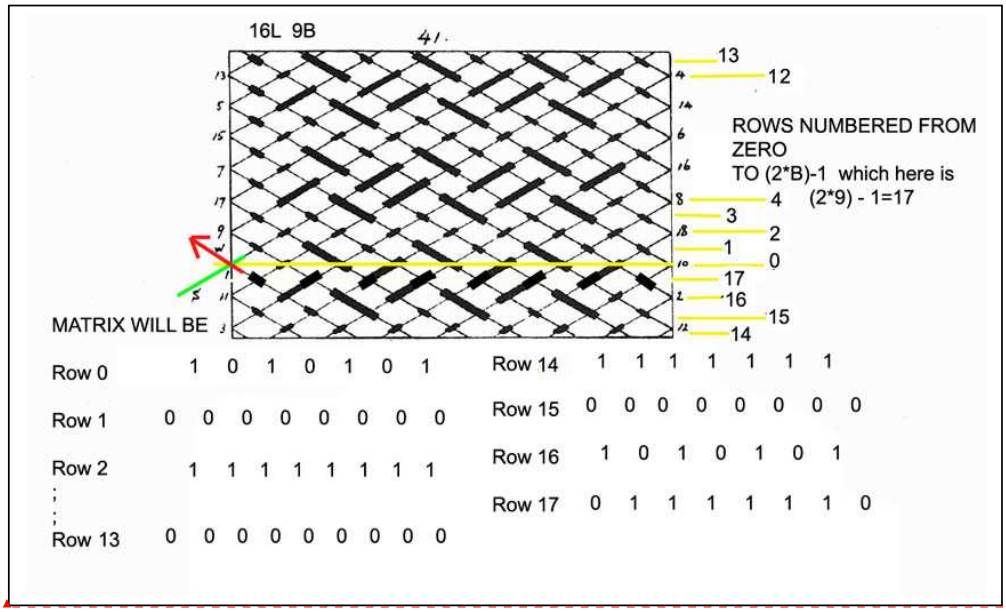
As in a Row-coded ALL the crossings in a *given* row are of the same type (either OVER or UNDER) the whole row is easily represented by only one of its crossings: the very first one on this row, the leftmost one crossing that is. (see diagram just above)
The 'pile' code in the above figure correspond to 110011001100
Note:
The ***matrix*** starts at **row ZERO** (Modulus oblige) and goes DOWNWARD continually till **row** numbered **(2*B)** *BUT ON THE DIAGRAM AND ALSO FOR THE ROW-CODING* the rows begin at **ROW ZERO** which is the one in direct alignment with the crossing (on the left side Bight rim) made by the SPart and the WEnd.
First go UPWARD till no rows are left (here last row up is 9) and start again at the very bottom of the diagram (here Row 10) and go UPWARD toward **row ZERO.**
When ALL the rows have been noted ONCE and ONCE ONLY verify your entries again before validating the whole matrix.

Each crossing in this upward zig-zag is "as read" by an ODD numbered HP and *not* in succession by ODD and EVEN numbered HPs. This is *very* important as for example a \ is an UNDER when read by ODD-numbered HPs *but* is an OVER when read by an EVEN-numbered HP (vice versa for a /)

Choice Neither-Nor ----------
Don't try to access the field that choice will open (it is not enabled for that).

Use the **MATRIX INPUT** (Saisie Matrice) button which will send you to the **Manual entry tab**.
After final validation the fully formatted matrix is written in the adequate field of **CREATION tab**. Only the program may write in there.

YOU MUST make the entries in THE SERIES OF BOXES;



Important note: **each** row is 'read' from **LEFT** to **RIGHT** to get the order of the crossings and 'as read' by an ODD-numbered HP for the nature of each crossing.

There is a whole set of functionalities in this **Neither Column-Nor Row-Coded tab**:
The entries here are strictly constrained and controlled by the application.

(There will be more said farther along in the topic **Neither Column-Nor Row-Coded tab**)

- You may gain access to the '**Entries Neither Nor'** tab ONLY if GCD= 1

- With **L** EVEN (L-1) is ODD so you need one Row with an ODD number of boxes and one Row with an V number of boxes ; first Row entered being ODD.
  With L ODD then (L-1) is EVEN you get ROWS of equal LENGTH and they are all with an EVEN number of boxes of course).

  The number of boxes that you get is based upon the **L** number entered**.**

- The MATRIX validation (only if the number of ROWS entered is correct) is made using the proper Button, this will transfer you back to the CREATION tag without erasing the entries validated in the MATRIX tab.
When the MATRIX ENTRY button in CREATION tab is pushed that action erases all entries made in **'Entries Neither-Nor' tab**.

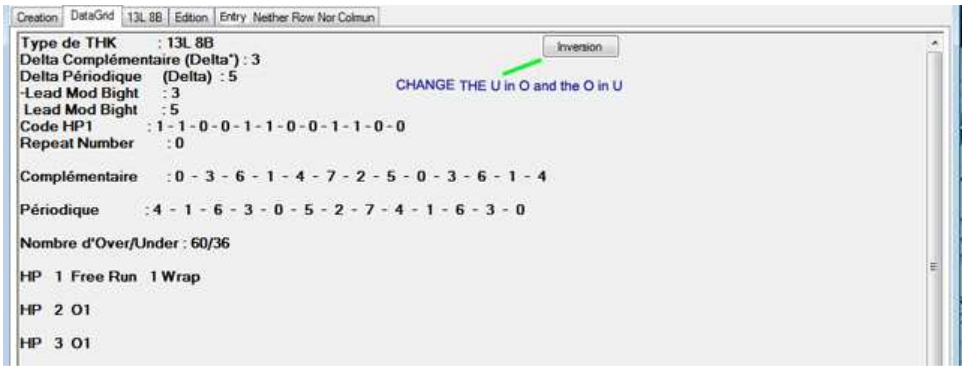
Note that in the **MENU** bar in **[FILES]** you may access **{SAVE AS}** if you want to save the MATRIX.
There is also an automatic backup upon closing.(see **{CONFIGURATION}** in **[TOOLS].**

DATAGRID tab----------

This is the program's personal work desk and it is used to save the knot with **[Files]{Save as}** [Fichier]{Enregistrer}

Best to use for that is EditPad Lite

(free at http://www.editpadpro.com/editpadlite.html)



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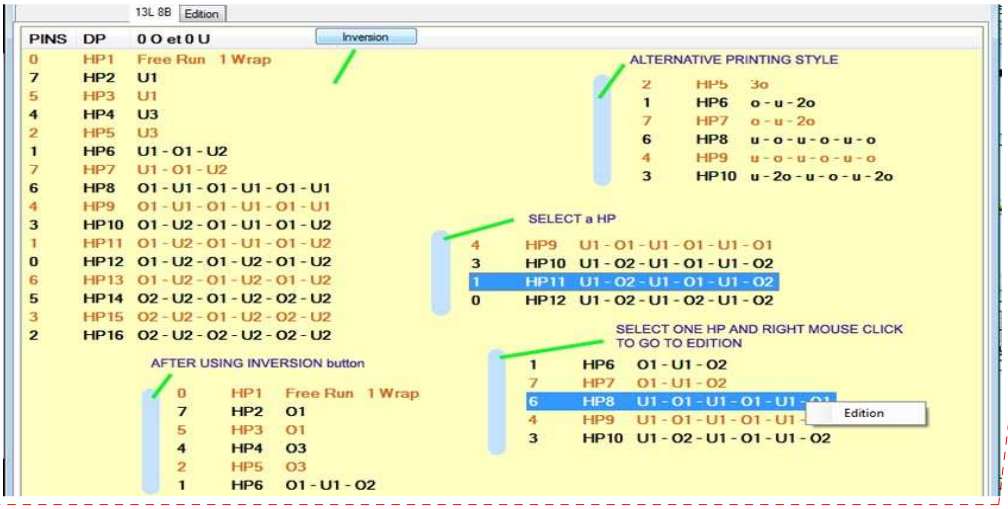
xL yB, former DATAGRID1 tab----------

This is the place where you get the coding of each HALF-PERIOD of the knot you entered.



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Note that you can easily adjust the **PINS, HP columns width** as you want them just by using the mouse pointer to move the appropriate index.

You may also change the FONT (size and type) using **Tools** in the **MENU** bar at the top of the application window.

A command button **| Inversion |** (**LEFT** Click) will change '**O**' to '**U**' and '**U**' to '**O**'.

The application is set to always give first the version of the knot with the greater number of OVER.
A (**Double LEFT** Click) on a HP selects it in blue and launches **Edition**

Mouse wheel may be used to go from one HP to another.

A **LEFT** mouse click can select a whole HP

A **RIGHT** mouse click on a HP opens a menu with **Edition** that will send you to the **Edition tab**.

EDITION tab ----------
It should be the one in use when you are making your knot using the screen as documentation.

Here you will have only one HP, the one you selected in **xL yB tab**.

TWO command buttons allow you to get the **PREVIOUS** or the **NEXT** HP (the current one being the starting point)

Here you get all the necessary indications about the PINS and the **TYPE OF CROSSINGS** to be made.

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You even get a visual indication of the Bight rim you are on and the one you are to go to:
TOP is [TOP of vertical cylinder, that is the horizontal mandrel rotated Pi/2 radians in the trigonometric direction (or 90° ANTI-CLOCKWISE)] for the **RIGHT** side Bight rim in the mandrel
and **BOTTOM** is for the **LEFT** side Bight rim.

A **double** **LEFT** mouse Click on a crossing turns it **RED** providing an easy and useful visual marker of where you are".
A **double** **LEFT** mouse Click on a crossing marked in **RED** removes that **RED** marking (mistake correction).

You may also select a crossing then use **RIGHT** mouse Click to open the menu and use **Done:** the selected crossing(s) will turn **RED**

A **LEFT** Click and moving the mouse pointer over one HP selects it and highlights it in blue .

A **RIGHT** Click opens **{Edition}** , a **LEFT** Click on **{Edition}** transfers the selected HP to the **Edition** tab

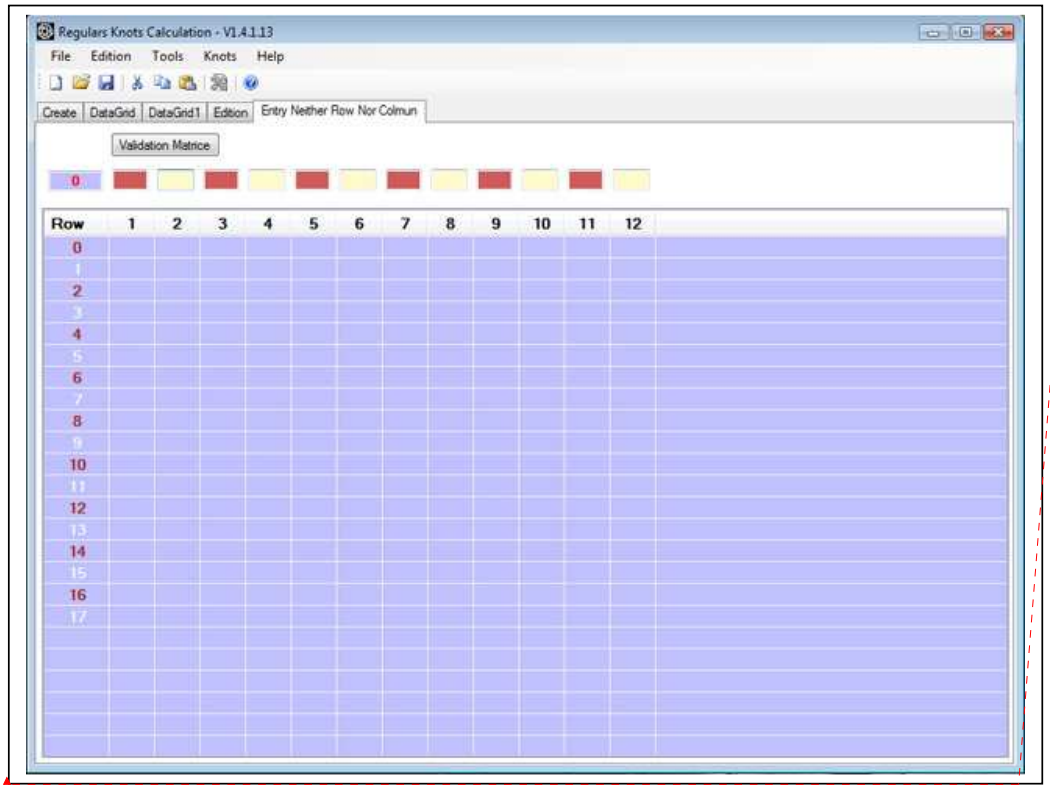
Mouse **WHEEL** moves, forward or backward, allow you to go from one HP to the other

Entry matrix Neither Nor tab ----------

After selecting radio-button '**Neither – Nor'** in **CREATION tab** , *not forgetting* to enter LEADS and BIGHTS, the activation of button **[Entry Matrix]** will send you to this tab (when using a pre-entered Neither-Nor knot using MENU/KNOTS you only need to push the **[Entry Matrix]** button and then when in the Entry Neither Nor tab you will need (after making a full verification) to push the button **[Matrix Validation].**

The frame of the matrix has been built for you = (**L-1**) columns numbered from **1** to (**L-1**): numbering is for 'orientation' of user, a special column, the leftmost one titled 'Row' holds the numbering of the ROWS (**2*B**, starting from '**0**') as seen and numbered in the 'à la Schaake' diagram of the finished knot.

Between button **[Matrix Validation]** and the matrix proper you find one blue cell (leftmost in the line) with red digit(s).
Digit(s) denote the ACTIVE ROW in the matrix.
To the right side of this blue cell are (**L-1**) cells of alternate colouring.



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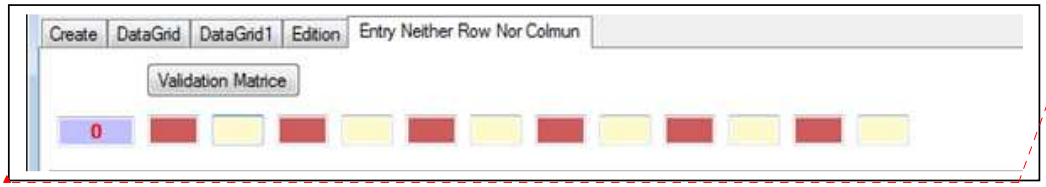
The dark brown cells are just “place holder” to conform to what can be seen in the finished knot diagram. They ‘hold the place’ where ‘in this’ COLUMN for ‘this’ ROW there is no crossing.

The very pastel light beige cells are the cells where the TYPE of the crossing is to be entered by user : ‘0’ for UNDER and ‘1’ for OVER (nothing else is allowed).



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The application ‘jumps’ automatically to the next cell to be given an entry.

You may go back, by selection with the mouse pointer, to a cell which already holds a digit.

If in a particular row where there is still a cell without its digit you select a previous cell holding a digit then keying in [ENTER] will erase this entire row ; using key “0” or key “1” will change the digit in the selected cell and cause a jump to the next cell.

If the row is full and you continue to key in either “0” or “1” you just go for another “round”.

When you want to validate a particular row that you are finished entering just key in **[ENTER]** and the row is then written in the matrix itself and the blue cell written with the number of the following ROW to be now entered.

Note that a **LEFT** DOUBLE mouse click with the point of the mouse pointer on the digit in the ‘Row’ column will put that particular row in the ENTRY CELLS for correction.

In the illustration just under you can see that the columns show the full number attributed to the column: that is because in **‘Configuration’** the column width has been set to 35 (with a narrower setting this would not be the case).

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With the very same L & B with the width left to its default value (or to any value under 34) you would have what is shown under:

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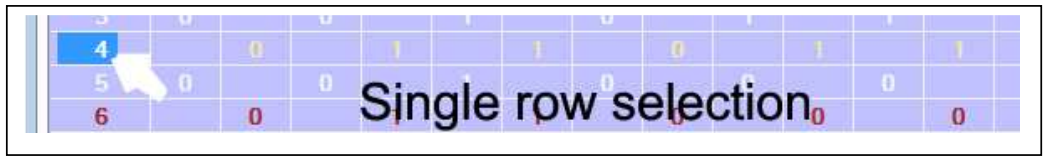
A part of the number is hidden so giving the appearance of a MODULO numbering.

There is a possible short cut for entering ROWS: You can COPY ROWS that you have already entered and PASTE them. There is a control on the PARITY of the number of the ROWS used: the ‘COPY’ ROW and the ‘PASTE’ ROW must be of same PARITY. (Both EVEN-numbered, or both ODD-numbered).

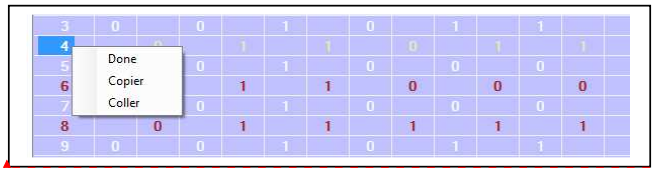
To COPY you may either use the keyboard manoeuvres or the mouse.
The COPY function is fully conforming to Windows.



The ROW selected is indicated by the blue highlighting of the ROW number and by a change in the colour of the “0” and “1” digits in that ROW

Those liking keyboard short cuts are not in need of any help as they are surely more adept than mouse users may be, so let us speak only of the manoeuvres with the mouse.

The illustration here under is the possible result of TWO different manners of doing things:



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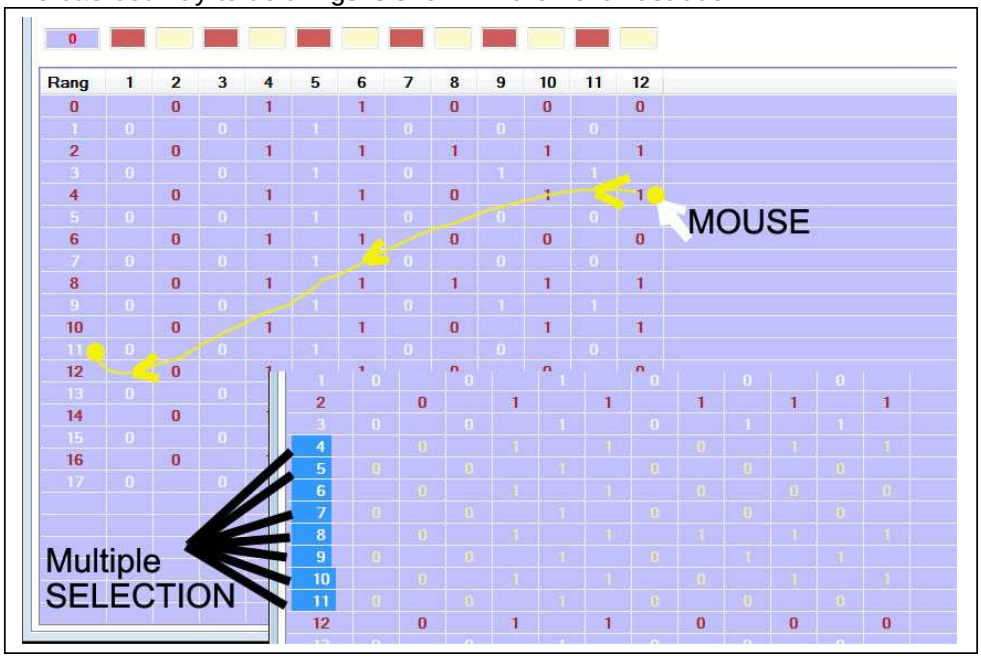
First what I will call the '**analytic**' method:
* Put the mouse pointer smack on the number of the ROW to be selected.
* **LEFT** mouse click
* **RIGHT** mouse click

Second what I will call the '**synthetic**' or '**integrated**' method:
* Put the mouse pointer smack on the number of the ROW to be selected.
* **RIGHT** mouse click

Those TWO methods exist with the multiple selections.
The **easiest** way to do things is shown in the next illustration.



Here I illustrated the **RIGHT upward** to **LEFT downward** but you may use a **LEFT downward** to **RIGHT upward** way.

*** position the mouse pointer on the 'start' line, in the last cell of the START ROW, this cell is in the rightmost COLUMN (L-1)

*** **RIGHT** mouse Click, maintain it and go to position the point of mouse pointer on the digit in the "arrival' row.

*** now, and only now, release the' till now' maintained **RIGHT** mouse button.

Selection is now done **AND** the **CONTEXTUAL MENU** is opened.

You may use a **LEFT** Click but then after the selection has been done you will need a **RIGHT** Click inside the selection to open the contextual menu

Note: the **ONLY REAL FUNCTIONAL HIGHLIGHTING** in the selected zone is the **BLUE** one. It is there that the point of the mouse pointer must be positioned during the activation of COPY.

To PASTE what was just COPIED:

*** chose the adequate ROW,
*** position the point of the mouse pointer on the ROW number in 'Row' column,
*** **RIGHT** mouse Click to open the contextual menu and
*** choose 'PASTE'

This is for a SINGLE selection but it will work as well for a MULTIPLE selection.

MENU bar----------

[Files]
--- Save as
--- Open
--- Exit (or Quit)

[Edition]

[Tools]
--- Font size
--- Configuration where you can choose :

Formatted: Font: (Default) Liberation Sans, English (U.K.)

* the folder to and from which you may be moving files
* the column width (largeur de colonne) for the matrix in the Entry Matrix Neither Nor (*34 or 35 is the minimum to get a full Column Number on the screen)*
* the number of files for the automated “save” upon closing the application
* The style of the HPs writing: O1 U1 or 1o 1u
* Fix your preferred type of knots which will be pre-selected at start time.
* Select your choice of language.

Chosen configuration of language and type of knot will be activated only after re-starting the application. All other changes should be immediate.

[Knots] where you get a selection of pre-written knots.

[Help] which is rather an ‘About RKBuilder’.

TOOL bar----------
Tool-tips will open if you let the mouse pointer stay on an icon.
From **LEFT** to **RIGHT** you get:

New : put all the fields “as new”
Open : used when you want to ‘IMPORT’ a knot’s file
Save **Cut** **Copy** **Paste**
The **‘?’** will open Help or About **RKBuilder©**

VERSION 2 : FEATURE ADDED

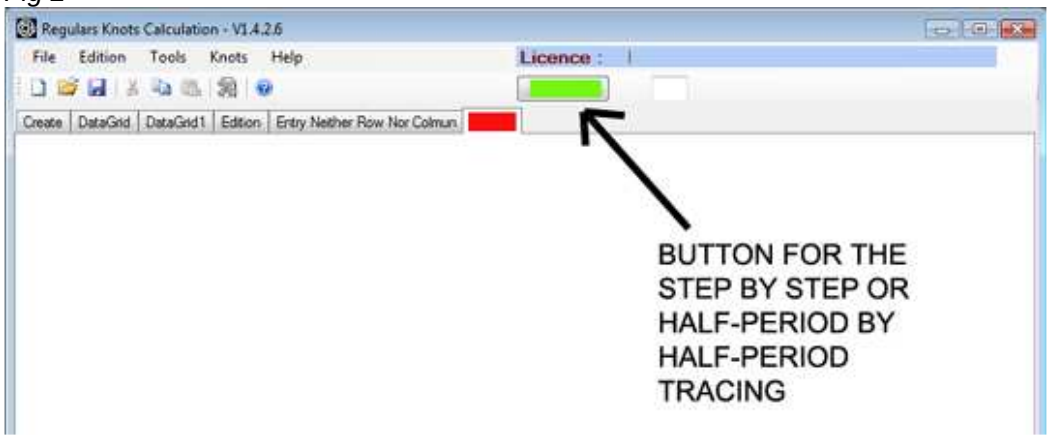
ALWAYS verify the time-stamp and/or version number of this manual and use the most recent version.
We would strongly recommend that you read the RKB User's Manual and annexes as you familiarise yourself with the program as this will help clarify concepts such as "Half-Period" (HP).
Always maximize windows as much as your computer screen size/resolution allows.
A feature in **TOOLS/CONFIGURATION** allows you **to check an "always open maximized" option**

A much awaited feature: **the 'IMAGE MAKING'.**
Fig 1

The rightmost tab (flagged **red** for the sake of ***Fig 1*** only - it is in fact a text in the application) is where the tracing will be done.
When opened for the first time in a session the tracing area is 'blank'.

Command button for the **Step by Step** tracing of the successive HPs is flagged in ***Fig 2*** by a **green marker** (text label in the application).

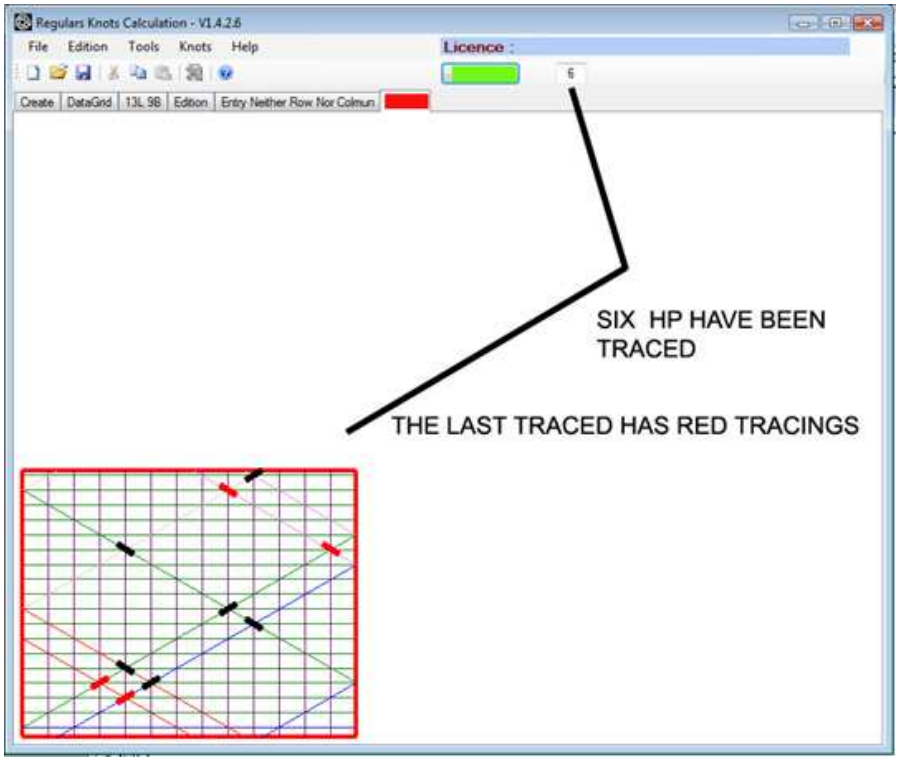
Fig 2



A count of the already traced HALF-PERIODS is shown in the small window to the right side of the command button. (***Fig 3***)

This number represents the very last HP traced which is distinguished from previous HPs crossings being traced in RED (in this case 2 OVER and 2 UNDER)
(colour setting is made with **Crossing Colour 2 OVER** and **Crossing Colour 2 UNDER**) while previous HPs have their crossings in **black colour** (setting the colours with **Crossing Colour 1** option. For further details see the **CONTEXTUAL MENU** below).

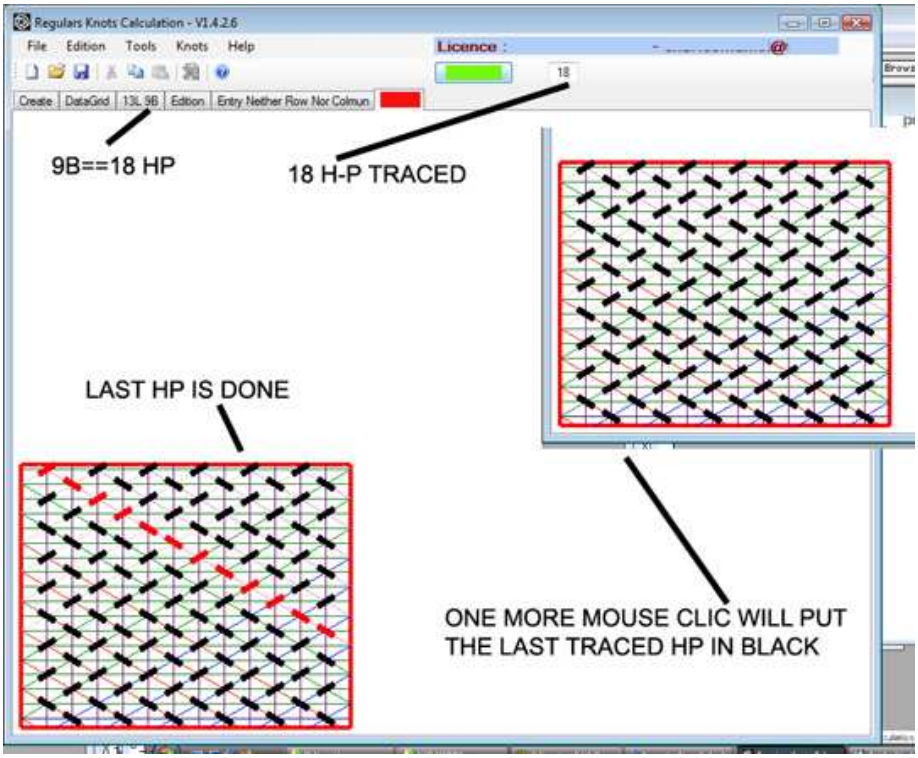
Fig 3



The last HP drawn is with crossings in **RED**, but one more click on the **Step by Step** command button or one more **LEFT** mouse click will make all the crossings go black as shown in ***Fig 4*** *which is a composite*.

The CONTEXTUAL MENU offers a '**FINISHED KNOT**' option that at any moment during the drawing allows you to complete the whole knot with all crossings in the chosen **Crossing Colour 1**.
A **RIGHT** click on the mouse gives you the same option of completing the knot.

Fig 4



LEFT mouse Click is functionally equivalent to a push on the **Step by Step** button.

While making the knot with the cordage using the screen as you would use a book page (only more user friendly than a book and more versatile) you need to quickly perceive the individual crossings. The individual crossings have been made "separated" entities for ease and speed of visual acquisition of their type.

A better 'feeling' for the appearance of the 'finished' knot will be obtained by making the crossings "joined" each to its neighbour with the same orientation.
There is an option for changing the width and the length of crossings as well as to change the thickness of the isometric lines (refer to the **CONTEXTUAL MENU** paragraph for more details.)

The **RED FRAME** **MUST BE VISIBLE ALL ROUND YOUR GRID TO ENSURE YOU ARE SHOWN THE** *ENTIRE* **KNOT.** (knots grids can extend well beyond the window area)

If the **UPPER HORIZONTAL LINE** of the **RED FRAME** is not visible in the window, maximise the window to the limit of your screen size/resolution.
If the full **RED FRAME** is still not visible it means that some **ROWS,** in fact **BIGHTS,** COULD NOT BE PRINTED IN THE AVAILABLE AREA**.**

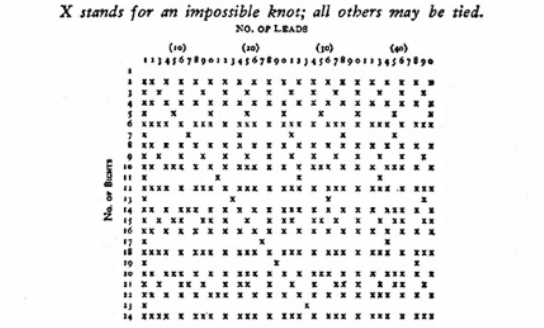
If the **RIGHT SIDE VERTICAL LINE** of the **RED FRAME** is not visible in the window, maximise the window to the limit of your screen size/resolution.
If it is still not there it means some **COLUMNS**, in fact **LEADS,** COULD NOT BE PRINTED IN THE AVAILABLE AREA.

ASHLEY (page 234 of ABoK) limits the 'reasonable' to **40 L 26B**
Fig 5

1314. A knot of three leads and one bight only is here illustrated.

A Census of All Single-Line Turk's-Heads Containing Not More Than 24 Bights and 40 Leads

X stands for an impossible knot; all others may be tied.



All Turk's-Heads of two leads are Overhand and Multiple Overhand Knots.

A good practical way to plan Turk's-Heads is to take a prime number for the larger dimensions (5, 7, 11, 13, 17, 19, 23, 29, 37, 41, etc.) and to use any smaller number, either odd or even, for the other dimension.

(Those dimensions are traced by RKnotBuilder and the grid should be visible in the window on most modern screens)

RKnotBuilder will draw all of those. (the calculation for the HPs coding is not limited to any number of LEADS and BIGHTS)

The visible part of the drawing is limited to the screen area and a human brain is unable to manage 2 or more screen widths and/or 2 or more screen heights. So it was decided that 'scrolling sliders' were just a waste of time.

Fig 6 (a composite image) should be self-explanatory, but in case it is not:
The bottom left corner grid is that of a grid in the making at its 8th HP and shows the default size for crossings.
The right grid in this composite ***Fig 6*** shows more realistic crossings of bigger length inducing a contact, a visual continuity between adjacent crossings of identical orientation.
Fig 6

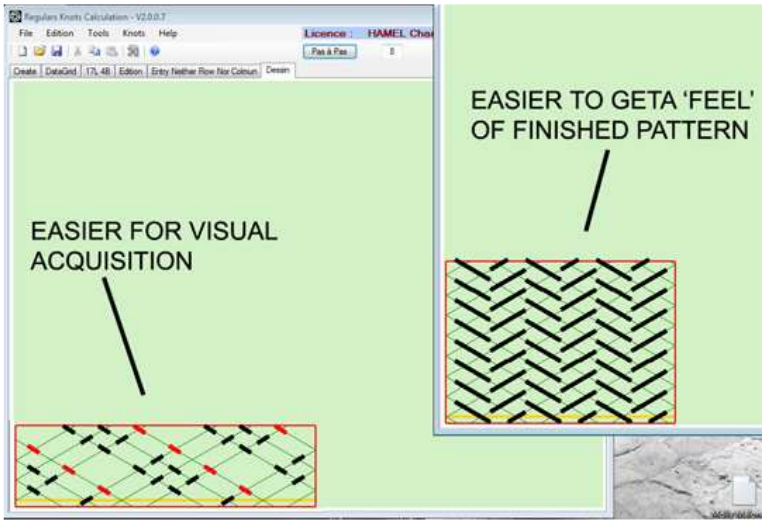
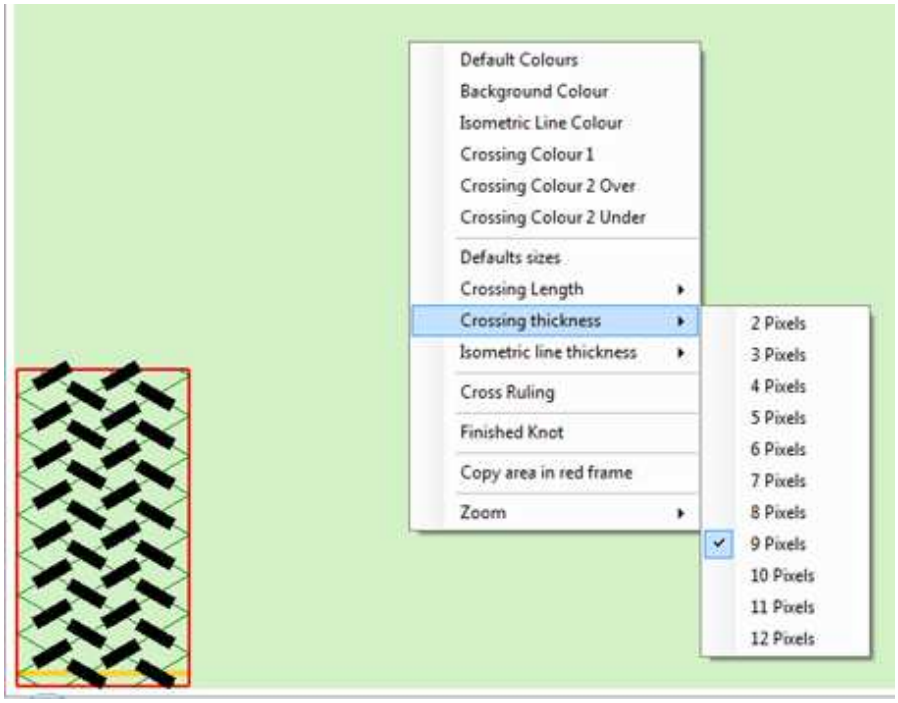


Fig 7

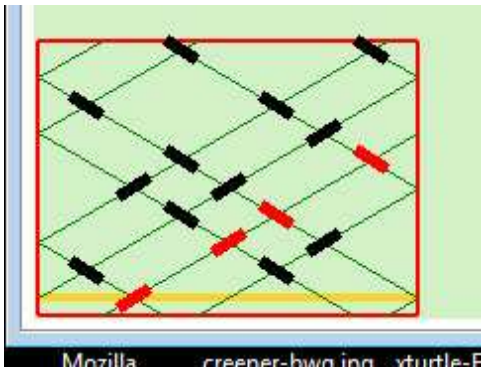


In both ***Fig 6*** & ***Fig 7*** the standard settings for line thickness and crossings are shown.
Default sizes in pixels: Isometric line thickness = 1 Crossing thickness = 6 Crossing length = 8

The **CONTEXTUAL MENU** offers a number of "customization'" choices.(***Fig 7)***
A **RIGHT** mouse Click made anywhere in the drawing area opens the **CONTEXTUAL MENU**

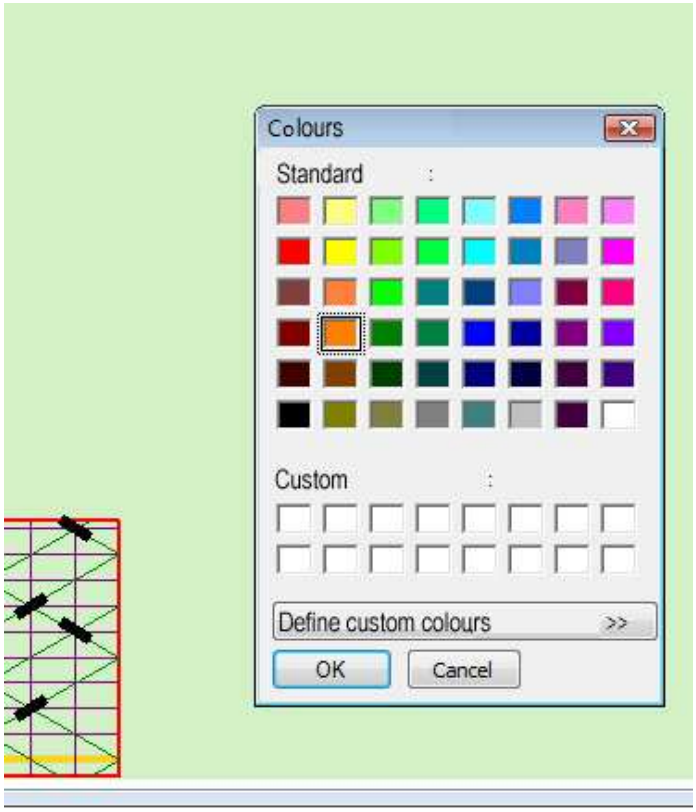
You have in ***Fig 6*** to ***Fig 8*** the **DEFAULT COLOURS** setting is action.
Note that in ***Fig 9*** the **CROSS RULING** option is checked.

Fig 8



In ***Fig 8*** an unchecked **Cross Ruling Option** is shown.

Fig 9



On activation of any of the following options containing the word "colour":

BACKGROUND COLOUR

ISO LINE COLOUR

CROSSING COLOUR 1

CROSSING COLOUR 2 OVER

CROSSING COLOUR 2 UNDER

the contextual window shown in ***Fig 9*** opens.

CHOICES MADE ARE AUTOMATICALY SAVED

The colour options are not just to allow users to play with colours but have a more important motivation of allowing for:
Colour vision impairment or
Impairment in Appreciation of Contrast

FINISHED KNOT **Option** does the whole tracing "**AT ONCE**".

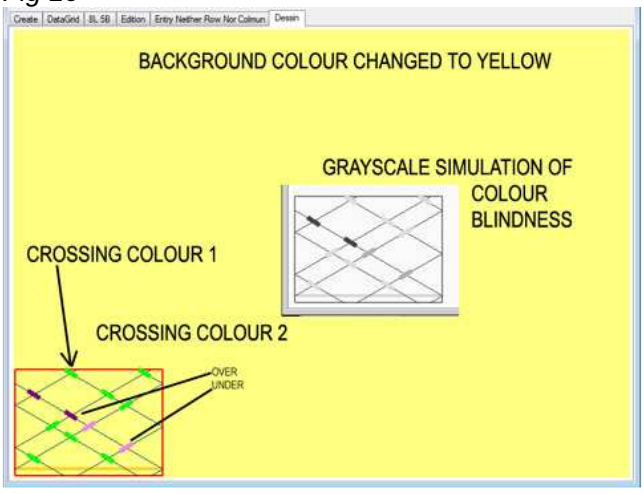
COPY Option of the **CONTEXTUAL MENU: COPY THE ENTIRE RED FRAMED AREA** to the *clipboard* **IF ALL FOUR RED SIDES** of the **RED FRAME** are present.
In other words you get the whole knot *as long as the entire* **RED FRAME** *is visible*, otherwise you copy what is visible in the working screen.

You may PASTE the clipboard content into any application that accepts such pasting.

A function that is a bit different from COPY of image is available through:
TOOL ICON *Save As* or ***FILE/Save AS*** **(**see below for more details about these functions).

Options chosen in the **CONTEXTUAL MENU TAKE EFFECT IMMEDIATELY**

Fig 10 is an example of customized settings (optimized for normal colour vision and contrast)
Fig 10

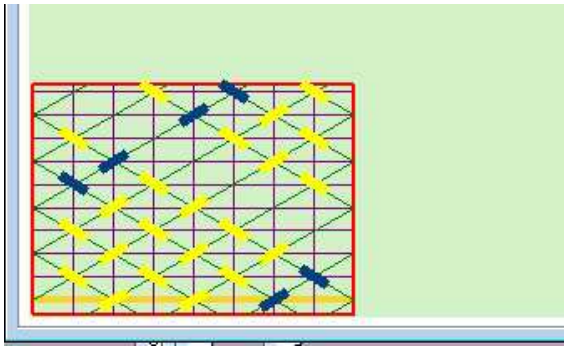


Crossing Colour 1
(the 'First Come' crossings or already laid crossings) are in **YELLOW**.

Crossing Colour 2
(The 'New Comer', the very last laid Half-Period crossings) are in **BLUE**.

You can also opt to have both the OVER and the UNDER crossings the same or different colours.
This option is only available for the current HP.

Fig 11

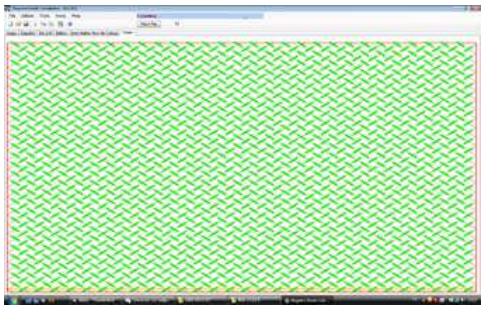


The Default setting is **RED** for OVER **AND** UNDER in CURRENT HP.
The horizontal line in orange yellow is **ROW ZERO**

The **ZOOM** Option in the **CONTEXTUAL MENU** is self-explanatory.

MAXIMUM NUMBER OF LEADS AND BIGHTS COMPLETELY PRINTED on a 17" (diagonal) screen with default settings:

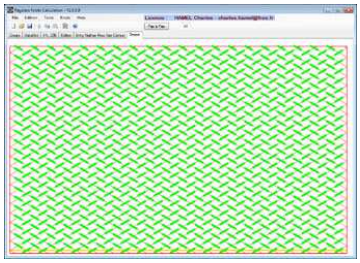
Fig 12



1440 * 900px window should allow **59L 27B** ***Fig 12***

1280 * 800px window should allow **52L 23B** not *illustrated*

Fig 13

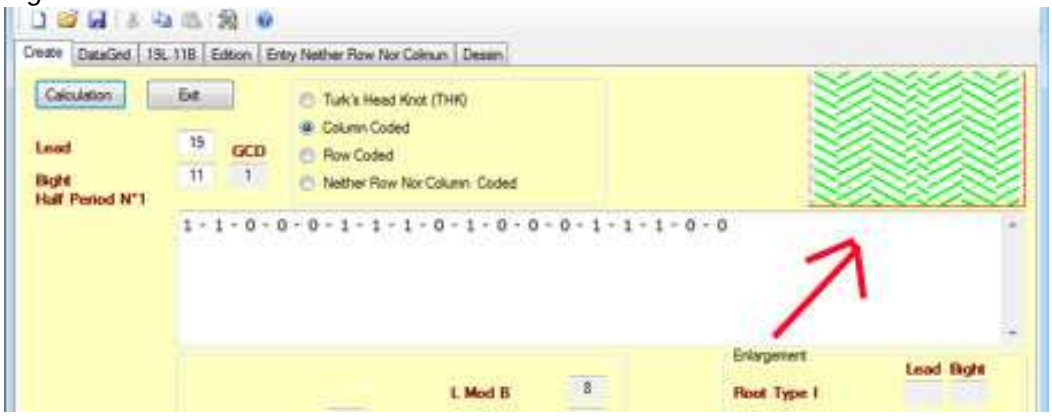


1024 * 768px window **41L 22B** ***Fig 13***

800 * 600px window should allow **31L 16B** *not illustrated*

PRE-VISUALISATION OF A KNOT

Fig 14

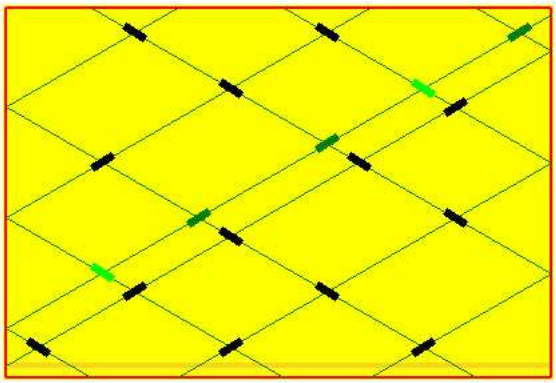


IFF a knot entered can be drawn on your computer (screen size/resolution allowing) ***inside*** a maximized window while **still showing** the **FOUR SIDES OF ITS RED FRAME AND IF** Number of **LEADS** is at most **31** *and* Number of **BIGHTS** is at most **23** then a miniature of it appears in the upper right side corner of **CREATION TAB**. (any size of grid can be compute but is not always visible !)

If the mouse pointer slides (does not need to hover) across the miniature it scrolls the illustration to the next available image in the collection.
To get the miniature back on screen push the command button **CALCULATION**

SAVING WHAT IS DRAWN IN THE GRID TRACING TAB IN AN IMAGE FILE.

At any moment of the tracing from HP1 to the finished knot you may **SAVE** what has been drawn directly to a file.
Fig 15



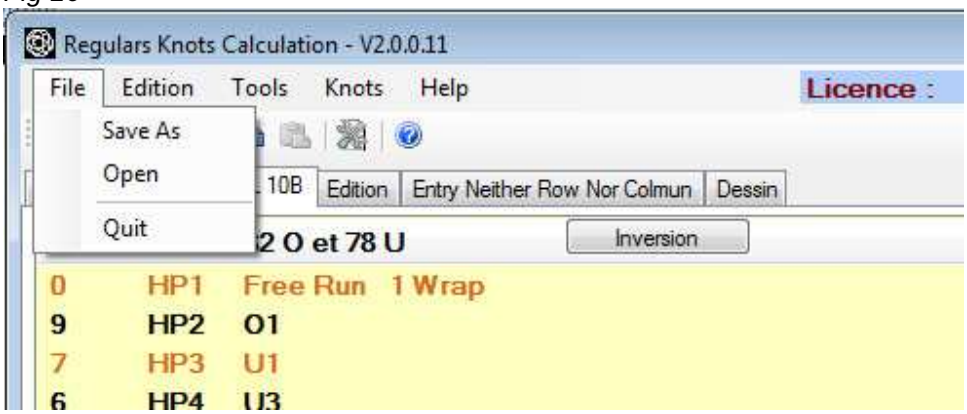
We have seen the use of the **contextual menu** to **COPY** the grid where you want it (The GIMP, a mail, Photoshop, Paint NET, and PhotoFiltre) use **PASTE** and **SAVE**.

BUT THIS WAY IS A DIRECT SAVING IN A FILE and makes use of

FILES / Save As or **TOOL ICON *SAVE AS*** BUT to save THE IMAGE you need to be in the **drawing TAB**

It is always the **ACTIVE TAB** that is concerned by **Save As**

Fig 16



Using **SAVE AS** in either the menu **FILES** or the **ICON TOOL**) in **ANY** active TAB, **EXCEPT** THE ONE WHERE THE DRAWING IS DONE, will save a **.TXT FILE with the KNOTS COMPUTATIONS.**

Using **SAVE AS** when the **DRAWING TAB** is the *active* tab offers the options of saving of **an image .JPG file and other formats that are indicated for the 'AS'**

Always watch for the destination folder in which saving is done so as to easily find it again! Certainly that goes without saying but it goes much better with saying it as they say in French!

Saving is done in the **WORKING DIRECTORY** specified in **CONFIGURATION** found in **TOOLS** menu.

By default the application puts as the **Working Directory** the folder were the application **.exe** is installed.

CONFIGURATION in the **TOOLS** menu is explained in RKnot Builder User's Manual.

VERSION 3 introduction of a "FREE DRAWING" module and some changes or rather adjustments.

QUICKLY OVER FLYING THE CHANGES BROUGHT SINCE VERSION 2

Modification of the ***Save As***

A new file format : **.RKB** format for exporting and importing a knot complying with RKnot Builder.

- EXPORT of the **entire DATA** of a knot in **.TXT** format
- Saving of knots **GRIDS i**n **.JPG** format
- Automated saving of **MATRICES** in **.RKB** format

Modification of the file OPEN or IMPORT : the only file format presently recognized (from any tab) is the **.RKB** format.

You may not access any other tabs than **CREATION** prior having entered **LEAD** and **BIGHT**, (**GCD** complying)

Now a listing of changes made :

- Light change in the **DATA tab** which now also shows the **Type of Coding.**
- In the **xLyB tab** checkable boxes were added allowing a follow on of the progression of the work when using the screen as documentation while making a knot.
  Columns may now be put in any order.
  Those changes in boxes and columns are deliberately not saved.
- In the **DRAWING tab** some improvements :
  * a more realistic zoom function.
  * a step by step zoom using clicks on the **Zoom** option line in the **Contextual Menu** ; same with backward zoom using **RIGHT** clicks.
- Crossing colours management.
- On the drawn grid now are shown, pertaining to the current HP, the number of the start and arrival PINS.
- Addition of a **Post-It** function that opens in the drawing area showing the info of the xLyB tab about the current HP.
  This Post-It can be moved with the mouse.
- Of course the highlight of this V3 is the **FREE DRAWING** functionality.

- Two different sort of menu bar for this.
- Suppression of the **Step by Step Button** which is now replaced by a **LEFT** mouse click inside the drawing area.
- Adaptative labelling of the **DRAWING Tab** according to the current mode of drawing in use
- Corrections of some minor unsatisfying traits in the V2.

With the V3 RKnot Builder now has **TWO graphic modes**.

*** The first one is simply the V2 mode which is the tracing of a knot the characteristics of which are **ALL** known (LEAD, BIGHT, Type of Coding and Code) ; those characteristics are summarize in the label given to the drawing tab in this mode : **Step by Step – 7L 5B – Neither Row Nor Column**.

*** With the V3 a new graphic mode appears : the FREE DRAWING MODE.
As indicated by its name it allows the user to freely draw, on an empty grid, his personal patterns using the mouse or to take an existing knot and modify it.
It was already possible with the V2 to get a drawing of a personal pattern but this required a deep knowledge of those knots and of their coding

- Two ways to enter this **FREE mode**:

  *** Either, after entering **L and B** and **Type of Coding** (COLumn coded, ROW coded, Neither-Nor coded ; the THK do not benefit from this mode) make a click on the **DRAWING tab** which will be renamed to **Free Drawing xLyB Type of coding**. If the **THK** coding was the select coding type you may not get the Free Drawing mode.
  *** Or
    *** either choose a knot in the library of pre-entered knots
    *** or enter all the characteristics of a knot (its code included of course) then click on the **DRAWING tab** which will now be set in the **Step by Step** mode (its default mode).
    If a click is done on the **Free Drawing** button then the mode is switched to **FREE DRAWING** mode. Note : the initial code is lost in this mode switch.

FREE DRAWING mode version 3
In this mode users have to enter their patterns with the mouse and accessorily with the keyboard.

There are different modalities for different coding type.

- COLUMN coded : each click on or very nearly on a Row and Column *intersection* (see annexe) will put *crossings* of a same type on each Row of **THIS** Column, a second click on one crossing will keep the crossings in place but will change their type, '**O**' to '**U**' or '**U**' to '**O**'.
  You may also change the type of the crossings by immediately using the keyboard **' C lowercase or uppercase 'Key**
- ROW coded : each click on or very nearly on a Row and Column *intersection* will put *crossings* of a same type on each Column of **THIS** Row, a second click on one of them will keep the crossings in place but will change their type, '**O**' to '**U**' or '**U**' to '**O**'.
  You may also change the type of the crossings by immediately using the keyboard **'R lowercase or uppercase' Key**.
- NEITHER row NOR column coded : crossings are put in one by one. Each time a second click on a crossing will change its type.
  With the mouse pointer on a crossing **'C lowercase or uppercase' Key** will change the type of the crossing(s) in a whole Column, **'R lowercase or uppercase' Key** will change the type of the crossing(s) in a whole Row

In those three types of coding you may also select an area with the mouse in the usual way : maintain **LEFT** click, move, release. The selection (which stays valid till a click is made in the drawing area) having been made you can then use FOUR icons to put crossings in the selected area : **/**, **** , **/**if=0, ****if=0.

/ and **** put a crossing AT EACH intersection (empty or with a crossing) in the selection

/if=0, **\if=0** put a crossing on each intersection THAT IS EMPTY OF ANY PREVIOUS CROSSING.

When all its crossings have been placed the knot is said to be "completed" (it is also "complete" in the meaning of having now ALL its characteristics defined).
It can now be computed by RKnot Builder when the button "**FINISH KNOT**" is pushed.
Calculations results are immediately made available in the **xLyB tab** as with any knot that would have been fully entered in the **CREATION tab**.
A click made inside the drawing area will begin the tracing of the knot HP by HP as that click switched the tab to its **Step by Step mode.** The change of labelling happens at the moment **"FINISH KNOT"** is pushed.

The  icon allows switching back to the **FREE DRAWING mode** to modify one or several crossings.
When finished with your modification(s), using the **FINISH KNOT** button will bring you back to the **Step by Step mode.**
The **Step by Step mode** can only be accessed with a completed (all crossings there), so complete knots (ALL characteristics known) otherwise you get a warning on screen.
BEWARE please : pushing the **FREE DRAWING button** will put every thing in a virginal state!

The  icon toggle the crisscrossing on and off.

The  icon finish the tracing of the knot.

The  icon change the type of all crossings **AND** finish the tracing of the knot.

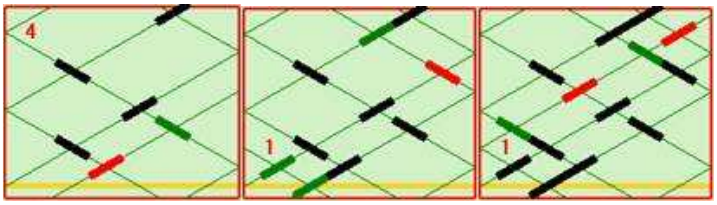
the number of the current HP appears there.

- One click in this box set the number back to **ZERO**, then with a click inside the drawing area the drawing will begin again from HP1.
- One click in this box put the number back to **ZERO**, then keying in a new HP number followed by a click in the drawing area will trace a grid with the selected number of HP. From then on clicks will draw the next HPs.

Those  two icons allow going back and forth between HPs in the range Current HP to HP1.

The  icon puts on screen a **Post-It** summarizing the **xLyB tab** info about the current HP.
The **Post-It** is closed using the icon in its upper right corner or when modifying **L** or **B**.

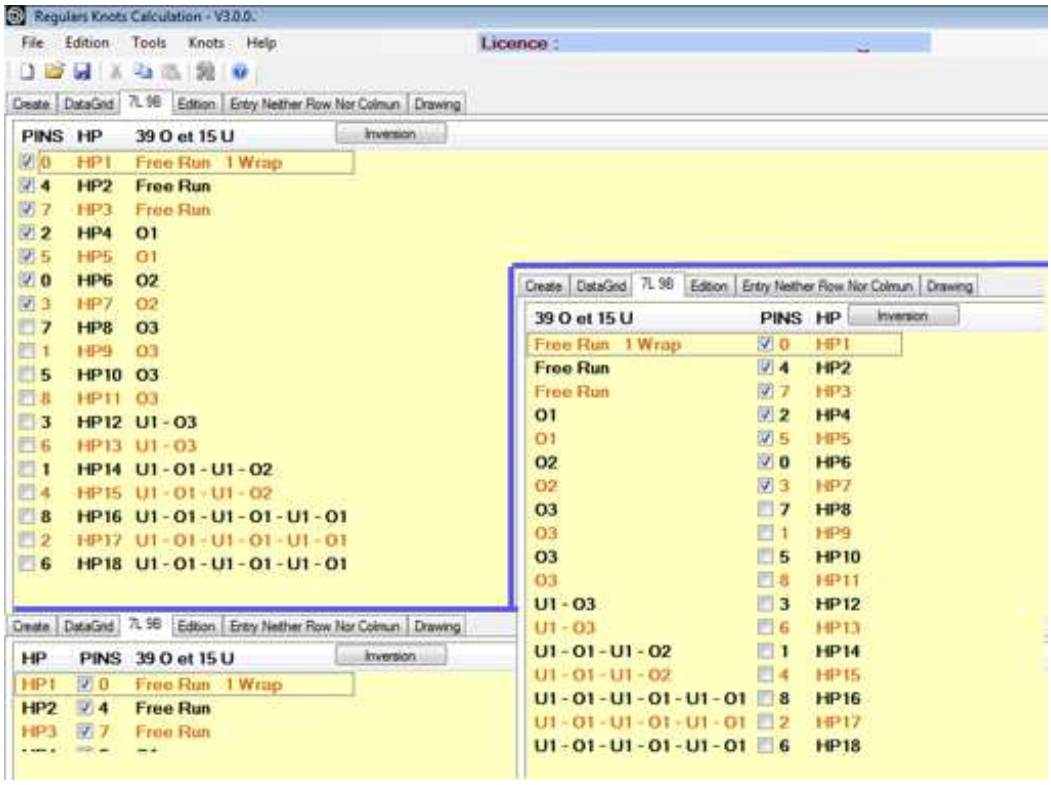
When in the **DRAWING tab** the ***Save As*** are done in **.JPG** format : the grid “as it is on the screen” is saved.



(/END of over fly)

ADDITIONS made in the THIRD TAB = xL yB

The following composite illustration shows all the asked for modifications which are now implemented :



The **COLUMNS** can now be put in any order you may prefer.
This modified order is *not* saved upon closing.
This is an “on the spot” only option asked by someone wanting, in case of a mistake on some crossing(s) in a real knot, to go in reverse not only in the actual knot but also when reading this **TAB**
For making room for a new disposition of the headers the **INVERSION** Button has been pushed rightward as far as possible.

NEW : a **LEFT** click in the **nO mU** header acts in the same manner as a push made on the **INVERSION** button.

CHECKABLE CASES ADDED to keep the count of all the HPs already done or to point the current HP being worked upon.
Cases are PASSIVE and do nothing else than keep a trace on the screen.

MODIFICATION OF THE SAVE AS FUNCTION

The ***Save As*** is changed.

There are now 3 different files formats that can be saved :
.TXT **.RKB** **.JPG**

ONLY .RKB files can be imported to the application.
.TXT and **.JPG** CANNOT be **IMPORTED BACK** to RKnot Builder to be worked on.

.TXT files are for use *OUTSIDE* of RKB

The .**TXT** files contain **ALL** the calculations and data in RKB has

Importing a **.TXT** file to RKB is technically possible but cumbersome and bothersome to program due to the formatting, translation and controls to be done.

Anyway those calculations are useless as 'IMPORT' : RKB will do the whole set of them.
So it was decided to go for a minimal format : .RKB format containing only the necessary and sufficient data for RKB.
Note that this **.RKB** file is written in pure TEXT (for those who want to access it to get their work back)

There are constraints to comply with:

*** the very first line in the **.RKB** file MUST contain (each **STRICTLY** separated from the other by **ONLY ONE** "space" character):
LEAD BIGHT Type of Knot
(THK = 0 ; Column code = 1 ; Row coded = 2 ; Neither Nor = 3)
e.g : **17 4 0** stands for a **17L 4B THK**.

A control is done on this line and ANY error detected stops the importation and user is informed by an error message about the file type not being acceptable.

The code or matrix as is the case is on the second line.
*** If it is a COLUMN coded the code for the HP1 must be valid, if too long it will be shortened to (**LEAD – 1**), if too short : an error message is given.

*** If it is a ROW coded then the coding of the rows zig zag must be valid, if too long it will be shortened to (**BIGHT*2**), if too short : an error message is given.

*** If it is a NEITHER NOR coded : the matrix must have valid dimensions and format even if not completed in all cells.

.TXT files are no longer usable from inside RKB **BUT** the **.RKB** files may be imported not only from the **CREATE** tab as previously but also from other tabs.

SUMMARY :

- **CREATION** Tab : saves its content **in .RKB** format.
- **DATA** Tab : saves its contents **in .TXT** format.
- **xLyB** Tab, **EDITION** Tab : save **in .TXT** the content of **DATA** tab.
- **ENTRY MATRIX** Tab : save its contents **in .RKB.**
- **DRAWING** Tab : save the grid drawn in the drawing area **in .JPG.**
- **Automated save of MATRIX** is **in .RKB** format, the file is generated all along the entries made in rows and at each validation of row. If **L** or **B** is modified then save is done in a distinct file so as not to lose the work already done.

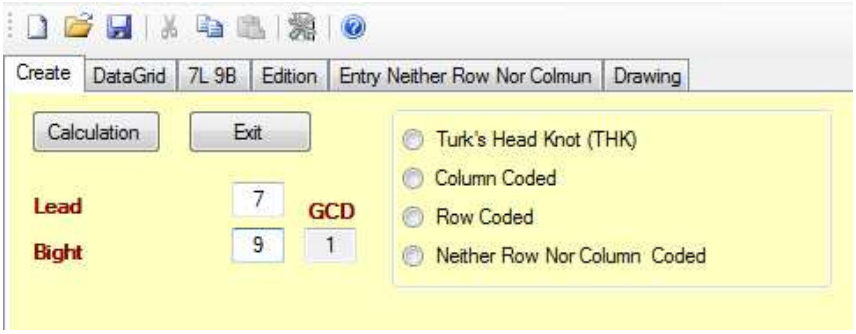
A SMALL WORD TO THE WISE ABOUT ONE OF THOSE THINGS THAT GOES WITHOUT SAYING BUT GOES SO MUCH BETTER FOR HAVING BEEN SAID ! :

Please remember to clean your saved documents at regular interval.
They do tend to clutter a hard disk with the greatest ease if not kept in check

A suggest good practice is to create inside the RKB installation folder a sub-folder that will be used as **Working Repertory** for the saved files. (set it as such using RKB **CONFIGURATION**)

ADDITIONS and CHANGES in the rightmost TAB : DRAWING

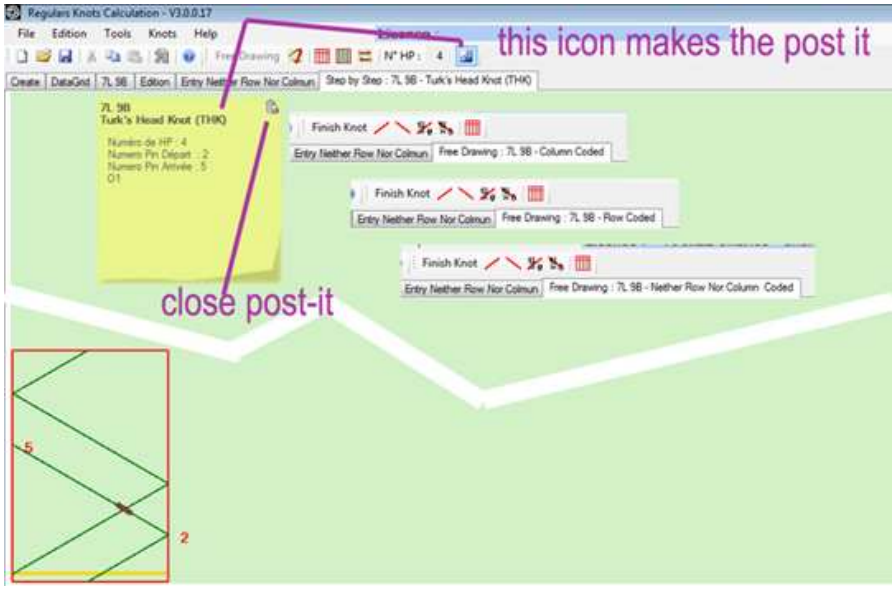
USING FREE MANUAL ENTRY of CROSSINGS USER NOW CAN DRAW A CUSTOM KNOT GRID



First choose the **TYPE OF CODING** for the knot you want to manually draw.

Second, to get access to the other tabs you MUST enter **LEAD and BIGHT**, (validate each entry with **[ENTER]**)
DO NOT enter ANY CODE ; NO code is equivalent to stating "I want the free drawing "

Now you may open the **DRAWING TAB** (this tab which when **CREATION TAB-or any other TAB** is opened is labelled **DRAWING** will, upon being opened, have its name changed according to what was just entered : **Graphic mode xL yB Type of Knot**).

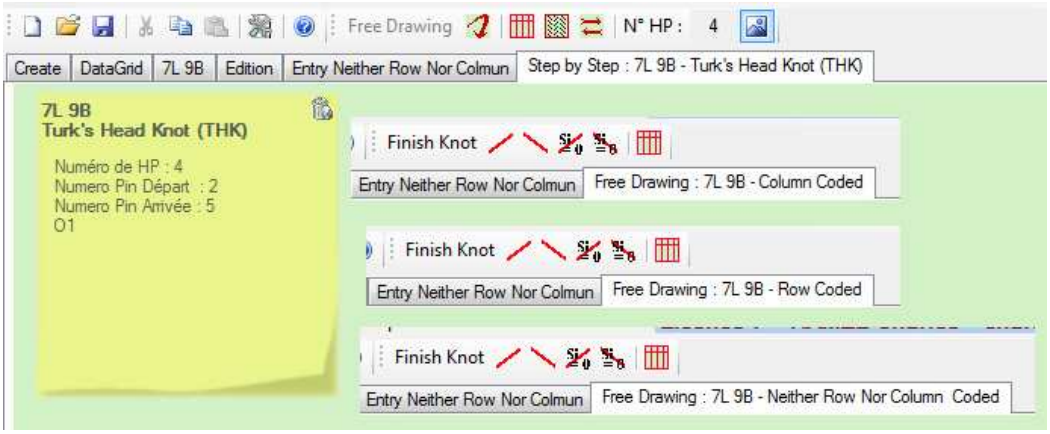


Icon for opening the **Post-It** is now (different in illustration above) : 

The **Post-It** can be moved to another place using the mouse as in any windows application : maintain **LEFT** button Click, move, release mouse button when in the chosen place.

The font in use in this **Post-It** is the same as in **EDITION TAB** (**Post-It** is a copy of what is in **EDITION TAB**)
The **Post-It** size will be proportional to the font size up to size **24**.
The currently opened **Post-it** is suppressed when **LEAD** and/or **BIGHT** change.
You close it with the icon in its upper right corner.

'!' THIS **WARNING Icon** will appear if some forbidden manoeuvre is made.
A mouse click anywhere in the pale green drawing area or on another icon will erase it.



TYPE OF CODING:

Turk's Head Knot (THK): **NO** manual drawing available as none would be useful since RKB with **LEAD and BIGHT** entered in the appropriate fields will draw any of them giving priority to the knot version with the maximum of OVER but an **INVERSION** function will put on screen the version with the maximum of UNDER.

Column Coded: a **LEFT** button mouse click on one row-column intersection will draw the crossings of the **ENTIRE COLUMN** in which this row-column intersection is.
A second click then gives the other type of crossing : an **OVER** if it was an **UNDER** and vice versa.
Note that is you select with the mouse all or a part of one or several Rows then it is each Column inside this selection that is drawn.
That is equivalent to drawing full or partial Row(s) while being in Column-coded.

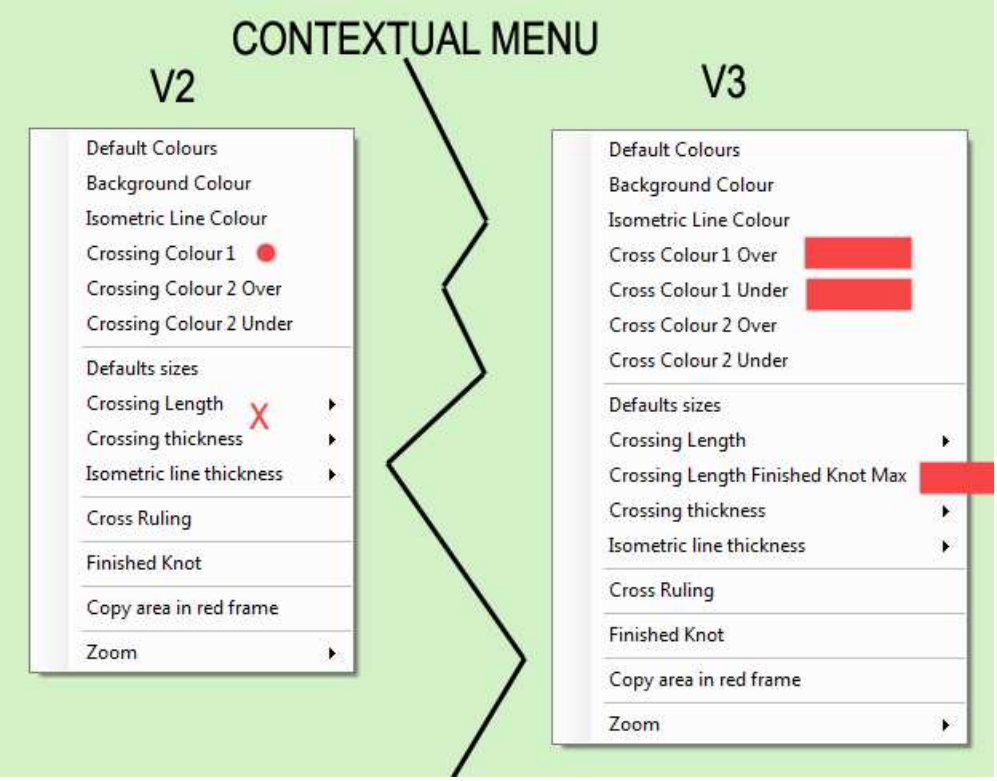
Row Coded: a **LEFT** button mouse click on one row-column intersection will draw the crossings of the **ENTIRE ROW** in which this chosen row-column intersection is.
A second click then gives the other type of crossing : an **OVER** if it was an **UNDER** and vice versa.
Note that is you select with the mouse all or a part of one or several Columns then it is each Row inside this selection that is drawn.
That is equivalent to drawing full or partial Column(s) while being in Row-coded.

Neither Row Nor Column Coded: this is probably where the **FREE DRAWING** will be the most attractive as not every one will like the **Entry Matrix**. Some will prefer the rigor and ease of control of **Entry Matrix** which has been kept available.

On the choice of **TYPE OF CODING** will depend what you get in the rightmost tab, the one for drawing.

DISPARITION : Button **Step by Step** is no longer present but its function is still there as **LEFT** mouse button click in green drawing area.

CHANGES made in the **CONTEXTUAL MENU**



A CHECKABLE option was added : **Crossing Length Finish Knot Max**
IF CHECKED then when asking for "**FINISH KNOT**" it will be the maximal allowable crossing length that will be used and not the length that you checked in the option just above : **Crossing Length**

ADDITION of options for **Crossing Colours:** Now you may have a maximum of **FOUR** colours in use

Type "2" is for crossings in the **current** HP
Type "1" is for crossings in the **previously laid** HP

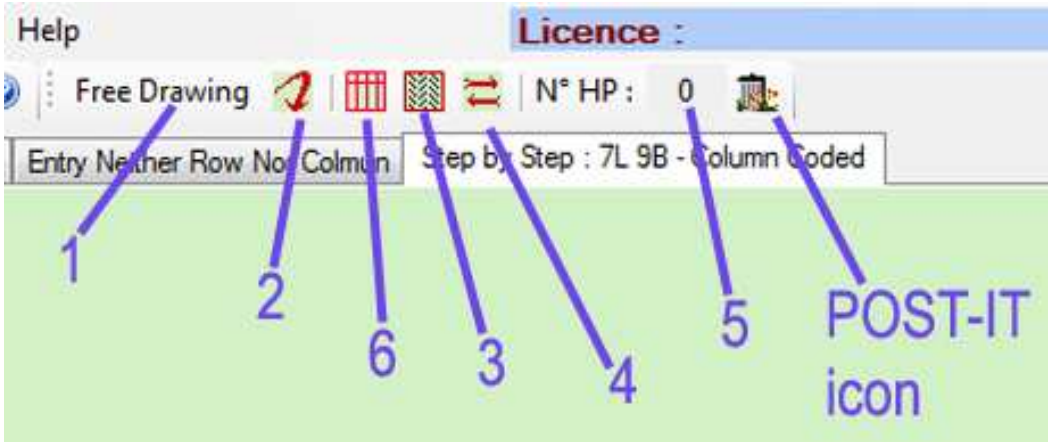
To get a visual understanding experiment using one of the knots in the library of knots (Upper **MENU bar -- Knots**.)

ZOOM

* a more realistic zoom function.
* a step by step zoom using clicks on the **Zoom** option line in the **Contextual Menu** ; same for backward zoom using **RIGHT** clicks.

APPARITION OF NEW ICONS (hovering with the mouse pointer will open a tool-tip reminding user of the function)

Case 1 : **TAB NAME IS Step by Step : xL yB Type of coding**



This STEP BY STEP TAB functions are the direct inheritors of the STEP BY STEP in Version 2.

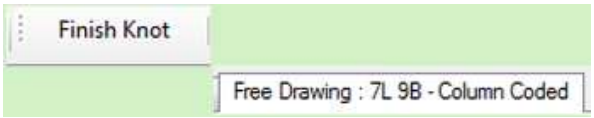
There is a SET OF ICONS specific to this rightmost tab which is depending on its function mode : **FREE DRAWING or STEP BY STEP**

This rightmost tab is labelled **DRAWING** when the LEAD and/or the BIGHT field in **CREATION TAB** are missing their number.
After entering **LEAD** and **BIGHT,** upon being opened, this **DRAWING TAB** will be renamed to **xL yB Type of the knot** whether it is in **FREE DRAWING** mode or in **Step by Step** mode. This mode will be the first indication in the new label.
Having been renamed it will switch back to **DRAWING** when the **CREATION TAB** is opened.

BUTTON 1 took the place occupied by the now suppressed **Step by Step Button** in Version 2.

This new button place can take **TWO** DIFFERENT APPEARANCES (functions).

Illustration above is of a **STEP BY STEP TAB.** Button is "**ARMED**" for going to **FREE DRAWING** mode and if pushed this present **Free Drawing Button** will transform itself and put on screen a tab in **FREE DRAWING** mode (see next illustration).



ICON 2 :

It allows user to modify the grid of a knot (any **CODING TYPE** except the THK choice which does not enable Free Drawing) by going into **FREE DRAWING** mode. A push on the **FINISH KNOT** Button will switch back to the **STEP by STEP** mode.

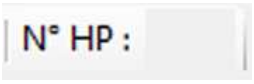
ICON 3:

This icon will put the grid in a finish state.
Finished state is with the crossing length set in the **Contextual Menu** unless you **CHECKED** the **Crossing Length Finish Knot Max** option in **Contextual Menu**

ICON 4:

Thanks to this icon there is no need to go back to **xL yB Tab** to use the **INVERSION** button and then return to the drawing tab.
Pushing this icon change **O** into **U** and **U** into **O** (RKnot Builder always prioritize the knot aspect with the maximum number of **OVER** but you may want to have the aspect with the maximum of **UNDER)**. Using it makes sense only on a knot with its full complement of crossings.

FIELD 5:



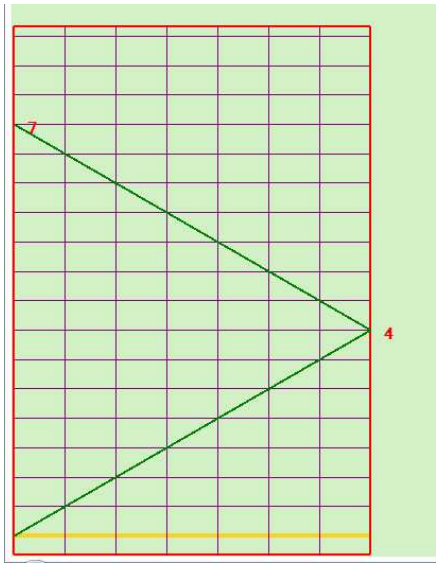
In this field is inscribed the number of the current HP.
"Things can be done" to this field as we will see later in the topic about "space and time travel" with HPs.

ICON 6:

This one is COMMON to the TWO MODES of the **DRAWING TAB**.
It toggles ON/OFF the **CROSS RULING** in the knot grid.
This is a way to 'modulate' the effect of checking or not checking the **CROSS RULING** option in the **CONTEXTUAL MENU,** which is a 'saved' option.

AN ASKED FOR NEW FEATURE :

You will see in the **Step by Step** or HP after HP grid small numbers in **RED** : those are the **PINS NUMBERS FOR THE CURRENT HP**.



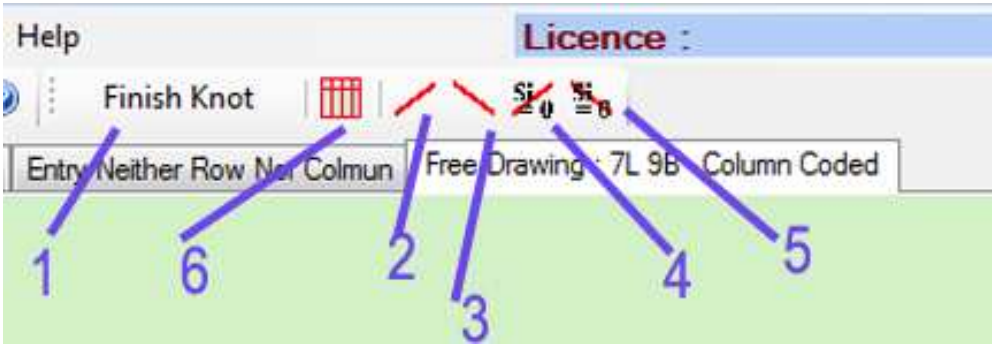
In the illustration on the left it is an **EVEN**-Numbered HP (N°2) so it goes

FROM
RIGHT BIGHT RIM (PIN NUMBER N° **4**)
TO
LEFT BIGHT RIM (PIN NUMBER N° **7**)

If in this **Step by Step** mode/tab with a knot that is not "complete" in the sense that ALL its characteristics (L, B, type of coding, code) are *not* known you ask for a **FINISH KNOT** using the icon you will get a warning : the **Step by Step** is not enabled.

[/ END of Case 1]

Case 2 : **TAB NAME IS FREE DRAWING. THIS IS THE REAL NOVELTY of V3 UNDER ILLUSTRATION IS THE DRAWING TAB IN ITS FREE ENTRY BY USER MODE.**



The SET OF ICONS here is different from the one in the previous illustration.

BUTTON 1 : : we are in the **FREE DRAWING TAB** so it is "**ARMED**" for switching to its **FINISH KNOT** function and when pushed it transforms itself and puts the tab into its **FINISH KNOT** STEP BY STEP form (see next illustration)

User may **SELECT** an area in the grid : selection with **LEFT** mouse button maintained down, mouse pointer is moved then button is released just as in any Windows application.

Selection can be used in any of the three **TYPE OF CODING** enabled for **FREE DRAWING**.

As long as NO MOUSE BUTTON CLICK IS DONE IN THE GREEN AREA the SELECTION will stay active (a click will make it disappear) : USING ONE OF THE FOUR CROSSING ICONS will trace the crossing(s) on the intersection(s) in the selection.
As long as no click is made elsewhere than on the crossing icons the SELECTION will stay memorized and the two icons  can be used for correction after a first use of any of the four crossing icons.

ICON 2 : traces BOTTOM **LEFT** TO TOP **RIGHT** slash at intersections or crossing inside a SELECTION

It will trace crossing(s) whether the intersection is still empty or already holds a crossing

ICON 3 : traces BOTTOM **RIGHT** TO TOP **LEFT** anti-slash at intersections or crossings inside a SELECTION

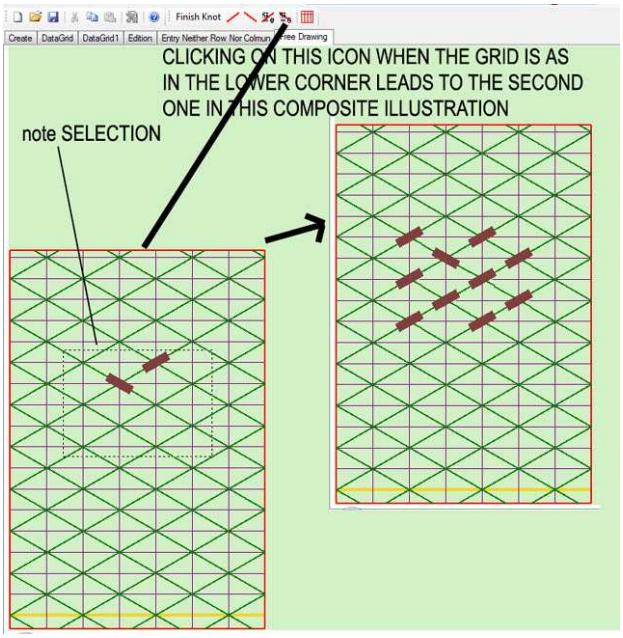
It will trace crossing(s) whether the intersection is still empty or already holds a crossing

ICON 4 : traces a BOTTOM **LEFT** TO TOP **RIGHT** slash at intersections inside a SELECTION

It will trace ONLY at intersections (no previously entered crossing).

ICON 5 : traces a BOTTOM **RIGHT** TO TOP **LEFT** anti-slash at intersections inside a SELECTION

It will trace ONLY at intersections (no previously entered crossing).



One way to «put in» crossings *if and only if* the **CODING TYPE** selected is **NEITHER-NOR** is :
→ to put the mouse pointer on one **crossing** or an *intersection* then mouse clic
→ then immediately use the KEYBOARD

[Ctrl]+[C] or **[C]** will do the ENTIRE COLUMN containing the crossing.

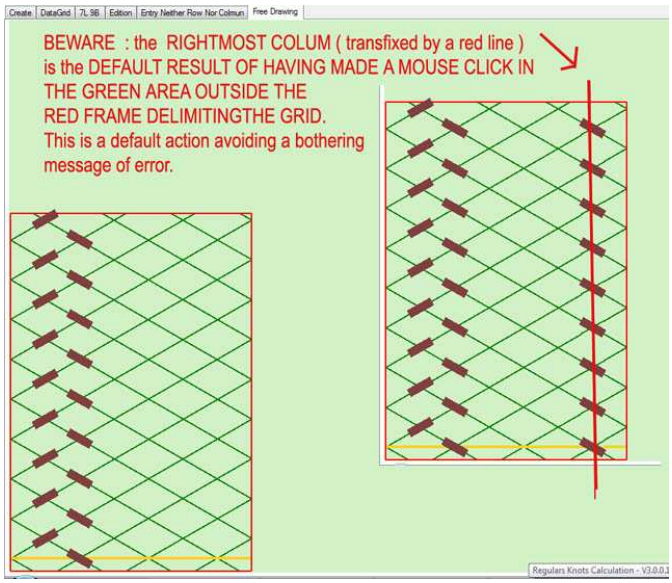
[Ctrl]+[R] or **[R]** will do the ENTIRE ROW containing the crossing.

ICON 6 : this one is COMMON to the TWO FORMS of **DRAWING TAB**.

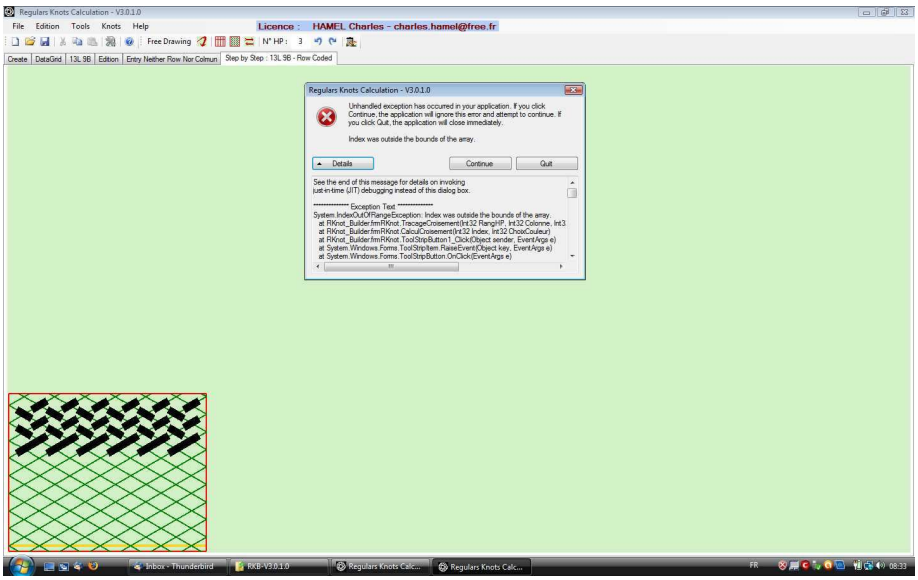
It toggles the **CROSS RULING** ON/OFF in the knot grid.

This is a way to 'modulate' the effect of checking or not checking the **CROSS RULING** option in the **CONTEXTUAL MENU.**

Next illustration : IF you click outside the **RED frame** then the default result of your action will be *"to do something"* in the **LEFTMOST COLUMN** in a Column coded. (Alternatively in a Row coded it will affect the **TOPMOST ROW**.)



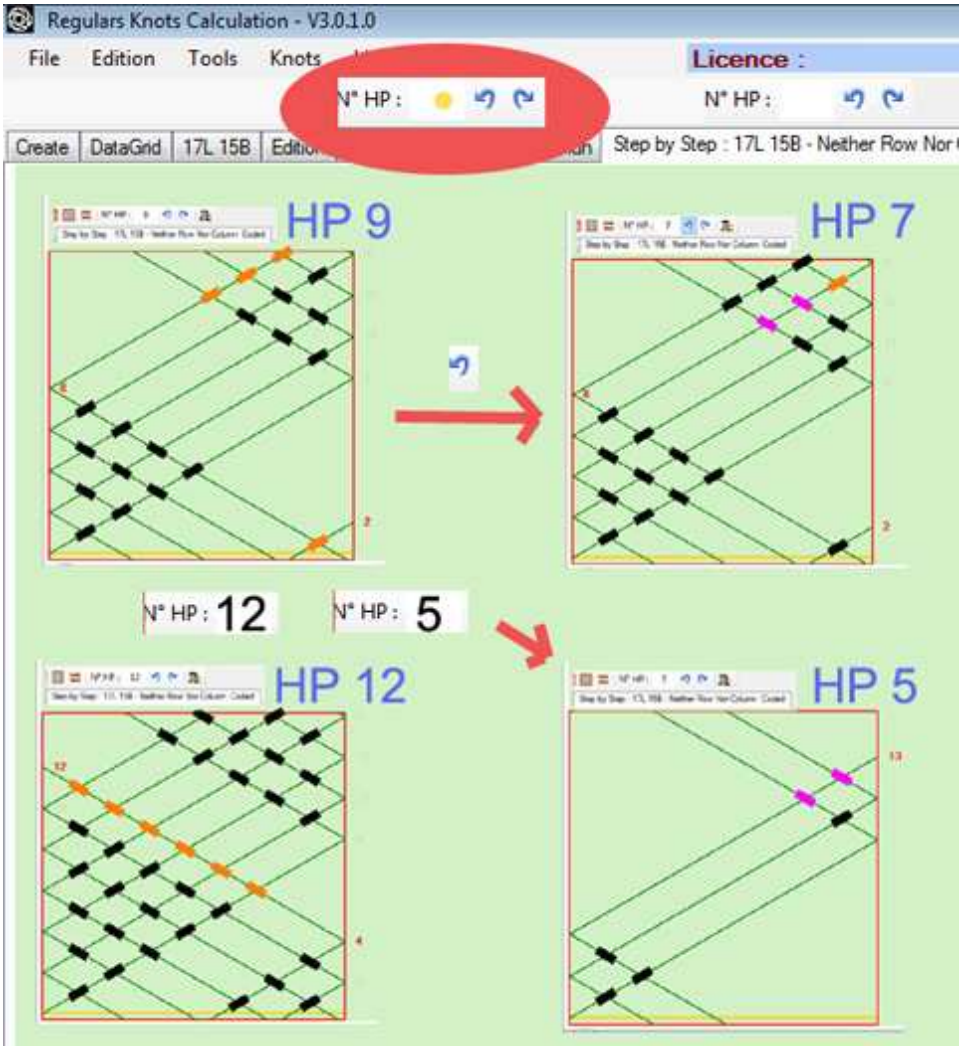
IT MAY HAPPEN THAN FOLLOWING SOME UNAUTHORIZED COMMANDS YOU GET THIS ERROR MESSAGE:



Just click on **Continue** and do the correct commands. Please **DO NOT** forgets to send a mail to rknotbuilder@gmail.com with a copy of the details and a description of the circumstances.

GOING BACKWARD IN THE STEP BY STEP DRAWING

One tester asked for the possibility, when in the making of a knot while using the **Step by Step** mode as documentation, to go 'back in time and space' to a mistaken HP / crossing for correction of the 'in the cordage' knot still using the screen.



THREE MEANS FOR A REWINDING :

*** The two icons : one for the **ONE HP BACKWARD**, one for the **ONE HP FORWARD** (two upper figures of the composite illustration just above). **NO HP IS ERASED** using that.
It is the crossings highlighting that goes backward and forward in time (previous or following) and in space (different HP) with the action on the appropriate icon.
In the illustration we went from highlighting of the last HP entered which was HP9 back to the highlighting of the crossings on HP7

*** The HP field which holds the HP number (two bottom figures of the composite illustration just above).
This time **SOME HPs WERE ERASED** and the diagram went back from **HP12** to **HP5** simply by entering " **5** " in the HP field followed by a **LEFT** mouse click in the green drawing area. From that point you may go on with the tracing of HPs.

*** **A RADICAL NEW START FROM ZERO** : ERASE THE WHOLE GRID AND START AGAIN : **LEFT** mouse click in the HP field put it back to " **0** ", then **LEFT** mouse click in the green drawing area starts the HP tracing from **HP1.**

SOURCES USED FOR RKBuilder©

(apart from ***THE BRAIDER*** – 60 issues)

Schaake & Turner are published by The Department of Mathematics and Statistics. University of Waikato –Hamilton – New-Zealand

A.G. SCHAAKE – J.C. TURNER

*** *New And Automatic Methods For Constructing Knots and Braids- REGULAR KNOTS* (1988) it was mainly this one that was used.

*** The Braiding of COLUMN-CODED REGULAR KNOTS (1992 Pamphlet N°7)

*** The Braiding of LONG COLUMN-CODED REGULAR KNOTS (Supplement to Pamphlet N° 7)

*** The Braiding of ROW-CODED REGULAR KNOTS (1993 Pamphlet N° 9)

VERY RECOMMENDED READING

A.G. SCHAAKE – J.C. TURNER – D.A. SEDGWICK

*** *Braiding REGULAR FIADOR* KNOTS (1990)

*** *Braiding Standard HERRINGBONE **PINEAPPLE** KNOTS* (1991)

A.G. SCHAAKE – T. HALL - J.C. TURNER
(T.HALL contribution is just drawing and it was a first and last)

*** *Braiding Standard **HERRINGBONE** KNOTS* (1992)

QUITE USEFUL READING

(but absolutely NO THEORETICAL RIGOR OR KNOWLEDGE, JUST GOOD OLD PRACTICAL)

ALL of Ron EDWARDS but in particular the 2 volumes of *Advanced Leatherwork: Vol 1. Interesting Braids and Flat Braids* *Vol2. Round Knots and Braids*

To get them see Martin COMBS http://www.angelfire.com/ak/skateworld/index.html
and of course RAMSKULL http://www.ramsskullpress.com/crafts.html

I WANT IT TO WORK IMMEDIATELY

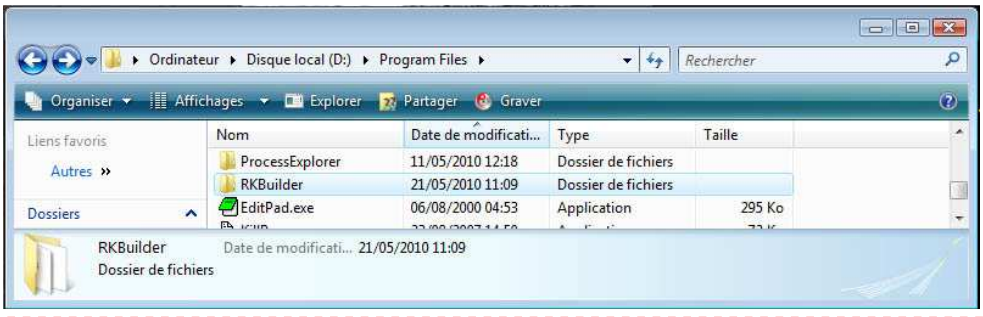
Go to **MENU bar** and open **[Knots]** / Noeuds
Select a **TYPE OF CODING.**
Double click on your choice; this choice will be immediately entered in **CREATION** tab
(You may explore the other tabs of course)

You need to read the whole manual to get the full use of this application.

INSTALLING THE APPLICATION

FRAMEWORK 3.5 must be fully installed on the computer used to run RKnot Builder. MINIMAL SCREEN RESOLUTION: SVGA 800 * 600
RKnot Builder has been extensively tested on XP / VISTA / WIN-7

Put the .ZIP file EXACTLY WHERE you want the application to be. (chose partition, repertory, folder..). Create your folder
D:\Program Files\ RKnot Builder was the choice made for the illustrations here.



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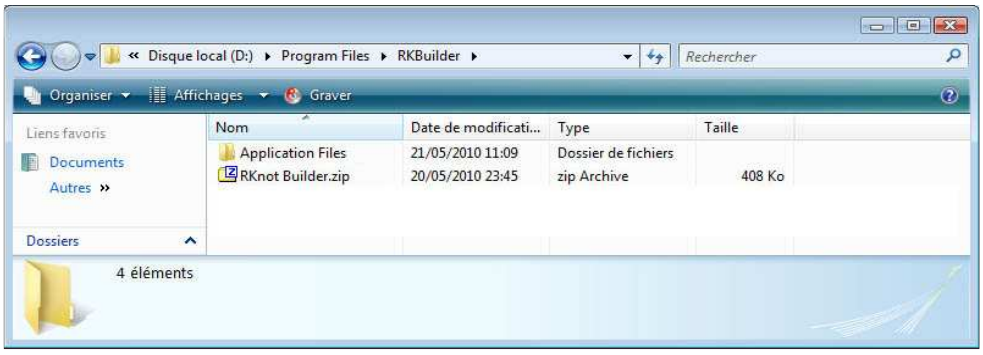


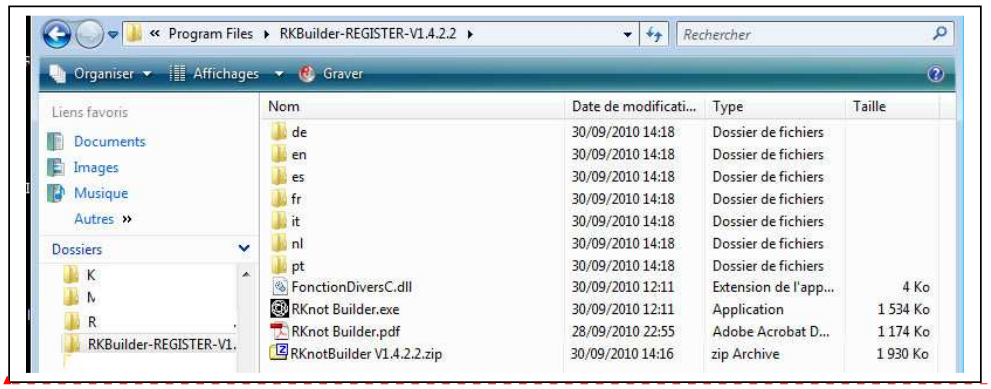
Formatted: Font: (Default) Liberation Sans, Font color: Dark Blue, English (U.K.)

Copy the RKnot Builder **.zip** file (if you received a SomeName**.000** file RENAME it to SomeName**.zip** – this .000 is to by-pass filters on the Net –

Uncompress the **.zip** (the free **7-zip** is good for that)
You are ready to go. Eventually make a short-cut and use the icon provided.

Nothing has been written in your register by the installation itself (only Windows itself and .NET may have, in the usual way of their behaviour to do such a thing). This makes RKBuilder an application you can put on a USB pen drive and run anywhere provided FRAMEWORK is installed on the host machine.

The following illustration is showing the RKB folder:



Formatted: Font: (Default) Liberation Sans, Font color: Dark Blue, English (U.K.)

'Configuration' needs a place (**Working Directory**) for saved **.txt** files.
For ex: where the **.exe** file is installed can be your choice but you can specify your personal choice in the field: **working directory**.

If you want one make a shortcut on your desktop or use RKnot Builder.**exe** directly from the folder.

No more than 3 copies of the files may be made (a copy is a copy on a different computer) before the application is blocked.

Anyway you can always explain your trouble to Claude HOCHET.
Claude will also be quite pleased to be contacted about making this program a thing 'on the move' with additions and modifications.
E-mail to: rknotbuilder@gmail.com

REGISTERING THE APPLICATION

See the separate .PDF titled REGISTERING

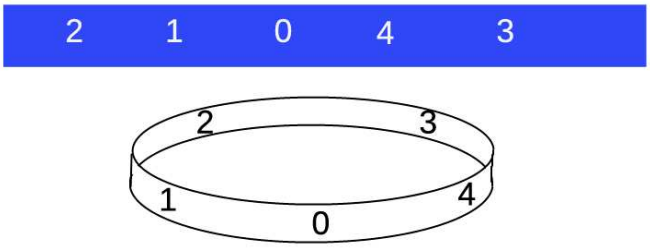
ANNEXE

Several testers specifically asked for the addition of these topics which they felt were obscure for many.

PART 1

NEVER FORGET THE "GOES AROUND" OR CIRCULARITY OR MODULUS IN CYLINDRICAL KNOTS

Fig 1

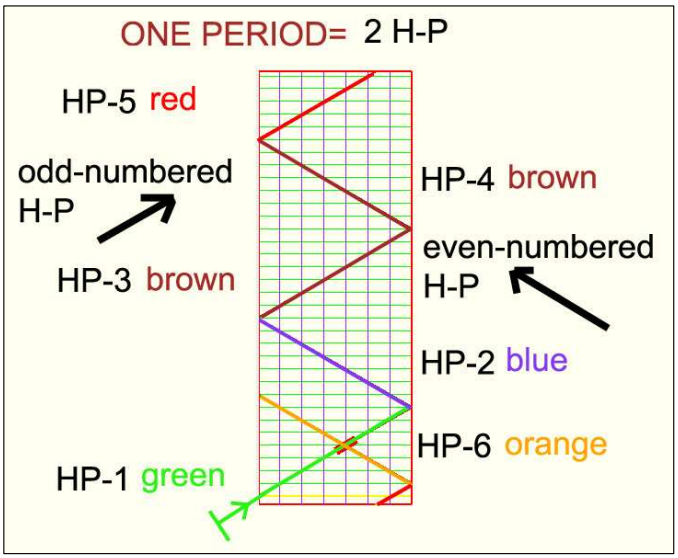


0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5

So look at grids as being flattened cylinders.

PART 2

SHORT REVIEW (frame of reference = horizontal mandrel)



A period is the cordage run from one Bight rim to the other rim and back to the start Bight rim.

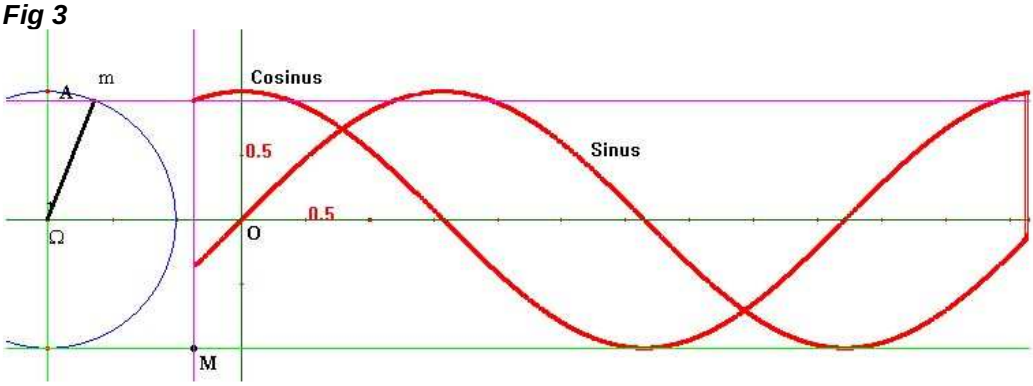
Obviously between the two Bight rims there is room for ONE HALF-PERIOD in each direction.

There are EVEN-numbered HPs going from the **RIGHT** side to the **LEFT** side and ODD – numbered HPs going from the **LEFT** side to the **RIGHT** side

Fig 2

HALF-PERIOD

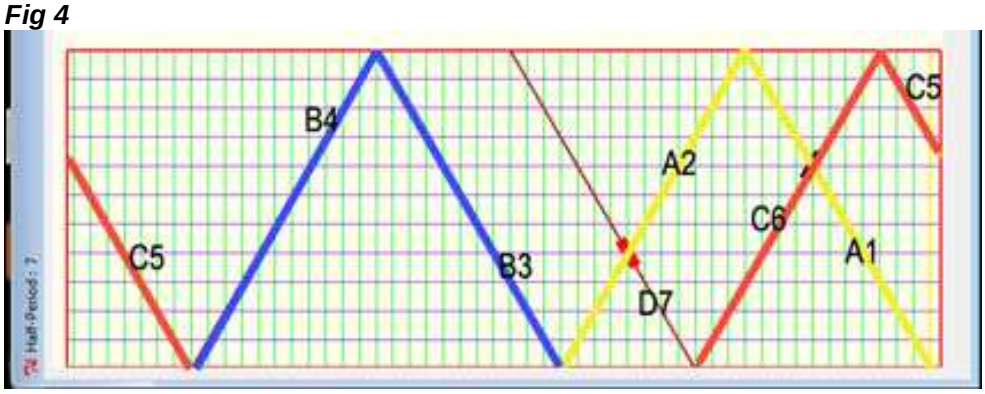
Fig 3



Remember school? and period / periodic / periodical = THAT WHICH COMES AGAIN AFTER A GIVEN SPAN OF TIME AND/OR SPACE (here are Cosinus and Sinus curves but thinks MOON PHASES for something more immediately understood in periodicity)

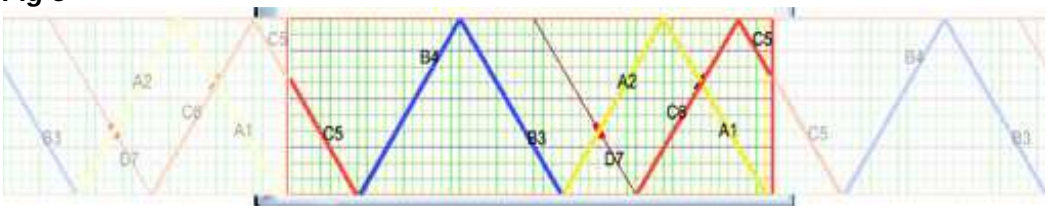
For Regular Knots = A PERIOD IS MEASURED STARTING FROM ONE BIGHT ON A RIM THEN RETURNING TO THE NEXT BIGHT - IN THE LOGIC OF THE KNOT SEQUENCE - ON THE STARTING RIM.

Fig 4



YELLOW PERIOD is made up of the **HALF-PERIODS A1** and **A2**.
Similarly the **BLUE** PERIOD is made of **B3** and **B4**.
The **RED** PERIOD is made of **C5** (which seems broken) and **C6**
C5 appears as being broken but **THINK CIRCULAR** and you will understand that it is **NOT** broken (***Fig 5)***

Fig 5



For the whole knot imagine a billiard ball trajectory which after **2* B** rebounds on the two lateral bands (Bight rims) comes back to its starting point: WEnd closes the curve by joining SPart.

PART 3

SHADOW OF A KNOT

A VERY USEFUL TOOL not only for topologists but also for knot tyers who want to gain knowledge

Fig 6

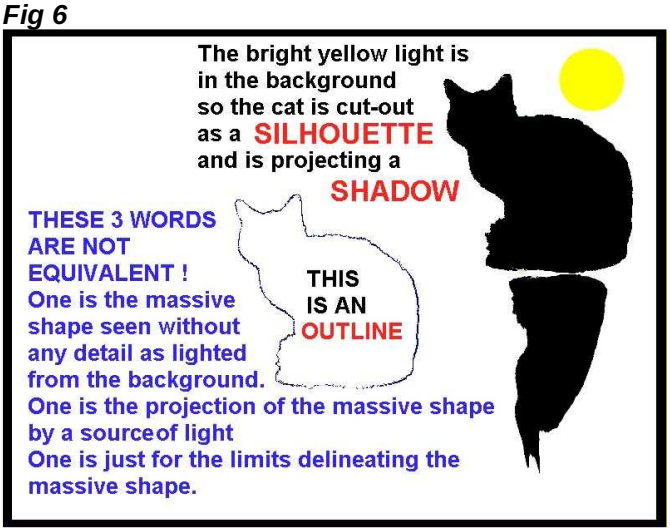
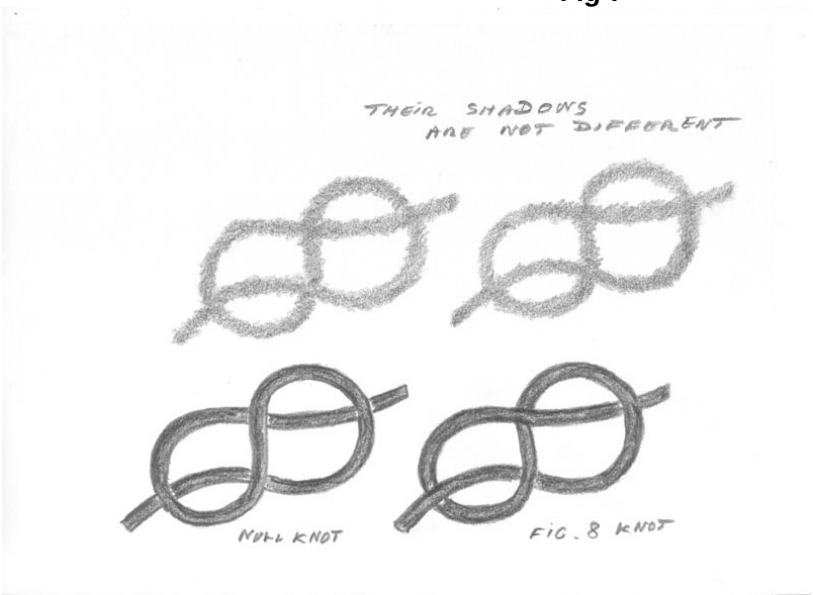


Fig 7

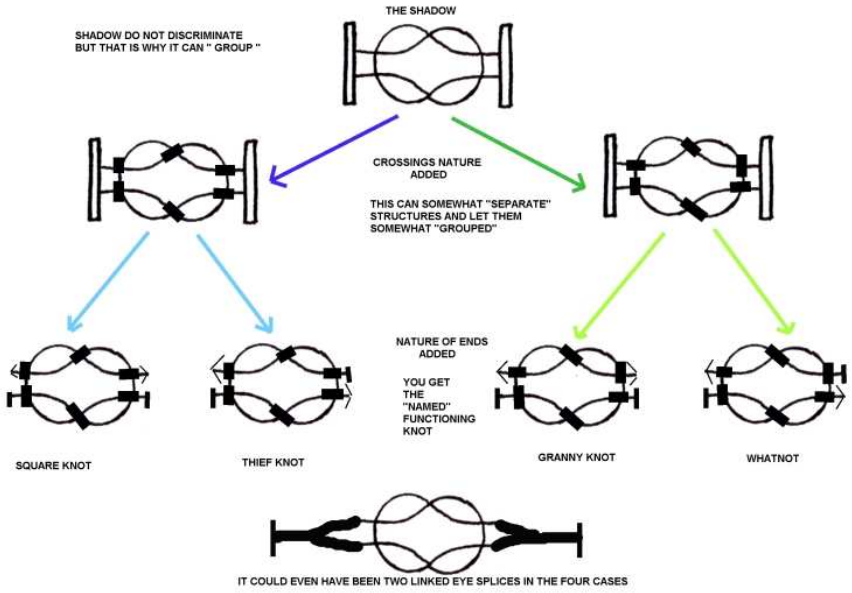


SHADOWS are very useful to immediately get the “common feature” in different structures.(***Fig 7***)

SHADOWS allow the study of inter-relationship as in ***Fig 7 & Fig 8***

ALL REGULAR KNOTS (Schaake's nomenclature) ARE SINGLE STRAND KNOTS MADE ON A TURK'S HEAD SHADOW or TURK'S HEAD CORDAGE ROUTE - THE SHADOW GIVES THE ROUTE TO BE FOLLOWED (but does not "describe" the nature of any of the crossings).

Fig 8

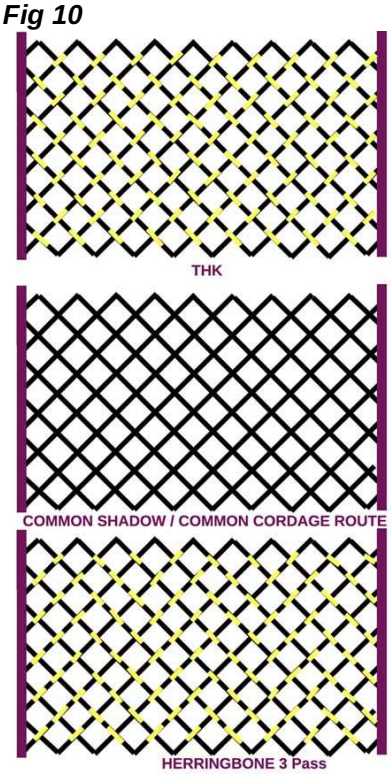


Don't make the mistake of thinking that the above is theoretical and is not based on reality, consider *Fig 9.*

Fig 9

PART 4

Fig 10



THE **PATTERN** (OVERALL CODING TYPE USED) IS **NOT TO BE CONFUSED** WITH THE **SHADOW** or ROUTE.

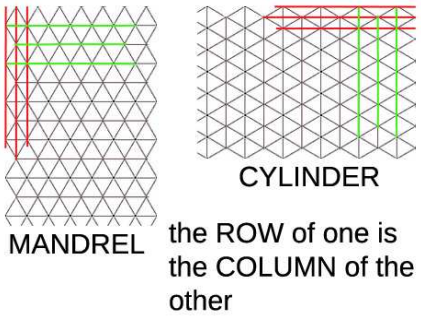
PATTERN and CORDAGE ROUTE ARE TWO VERY SEPARATED CONCEPTS

On a GIVEN CORDAGE ROUTE it is possible to make VERY DIFFERENT KNOTS by applying a different coding (or pattern) for each.

PART 5

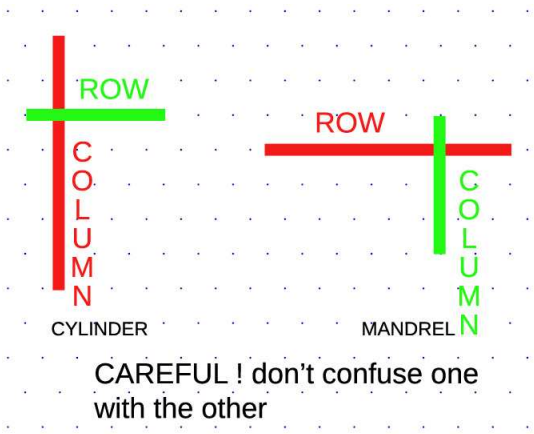
FRAME OF REFERENCE AND CODING TYPE

Fig 11



MANDREL is seen as HORIZONTAL so there is a BIGHT RIM on the LEFT SIDE and ONE on the RIGHT SIDE

Fig 12

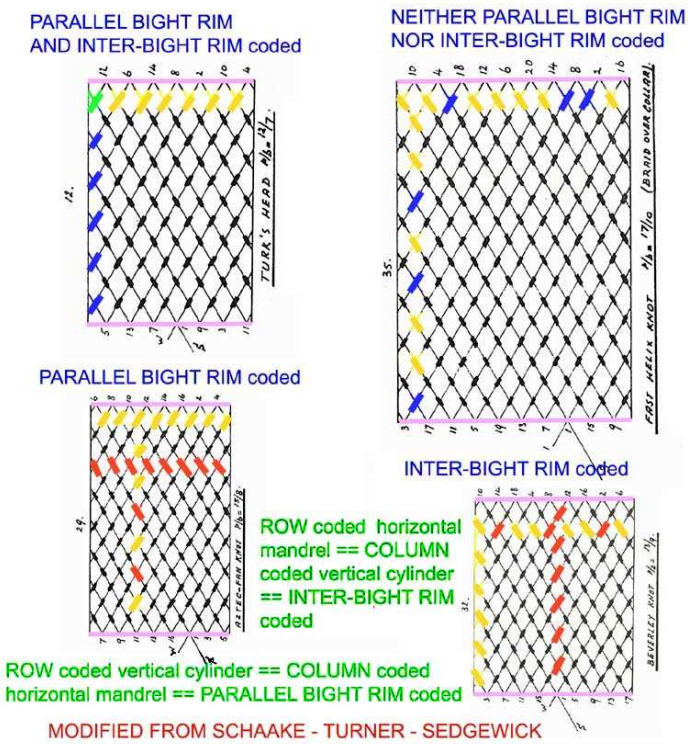


CYLINDER is seen as VERTICAL so there is a BIGHT RIM at the TOP and ONE at the BOTTOM

In ***Fig 11*** the **mandrel** is turned 90° CLOCKWISE to give the **CYLINDER**.

Fig 13 gives a way to use the same label for MANDREL OR CYLINDER AS IT IS **FRAME INDEPENDENT AND ONLY BELONGS TO THE KNOT ITSELF.**

Fig 13



Adding the coding of the crossings allow a strict and logical differentiation of knots

Note that the ROW and COLUMN coded appellation are QUITE MYOPIC and change drastically with the frame of reference.
It is *never* a good idea to keep a frame-dependant point of view.

A point of view INDEPENDENT of the frame of reference because it is INTRINSIC to the object is much, much better hence my
INTER-BIGHTS coded and **PARALLEL BIGHTS coded**
appellations that do NOT vary with Horizontal Mandrel versus Vertical Cylinder but stay unchanged because they belong to the knots themselves.

Anyway the 'parti pris' adopted in the **RKBuilder**© application is Schaake's horizontal **mandrel.**

---- In a **ROW AND COLUMN-CODED** knot in a GIVEN column ALL the crossings are of the SAME TYPE (either OVER or UNDER) and in a GIVEN row ALL the crossings are of the same type.
---- In a **COLUMN-CODED** knot in a GIVEN column ALL the crossings are of the SAME TYPE (either OVER or UNDER).
---- In a **ROW-CODED** knot in a GIVEN row ALL the crossings are of the SAME TYPE (either OVER or UNDER).
---- In a **Neither Column Nor Row –coded** Columns AND Row may be with crossings of different type = a mix of OVER and UNDER.

Now take also note of the FACT that there are STRICT RULES governing the classification of those Regular or Standard Knots.
In particular you **MAY NOT** extend in an arbitrary way, say a GAUCHO and still call it a GAUCHO.

The 'basic coding' can be found in page turksheads_22.html in
http://preview.tinyurl.com/38mrcp
for those wishing to understand things a bit more.

PART 6

Fig 14

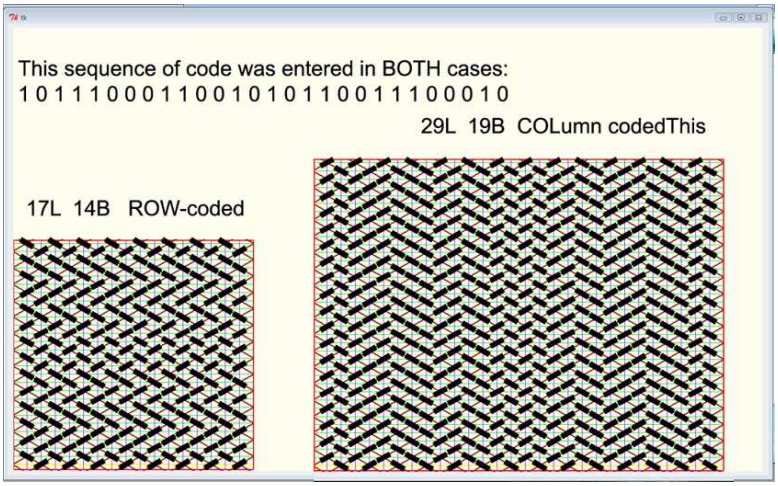


Fig 14 was made to show how the **EXACT SAME SEQUENCE OF CODE APPLIED EITHER AS ROW-CODE or as COLUMN-CODE LEADS TO QUITE DIFFERENT PATTERNS!**

PART 7

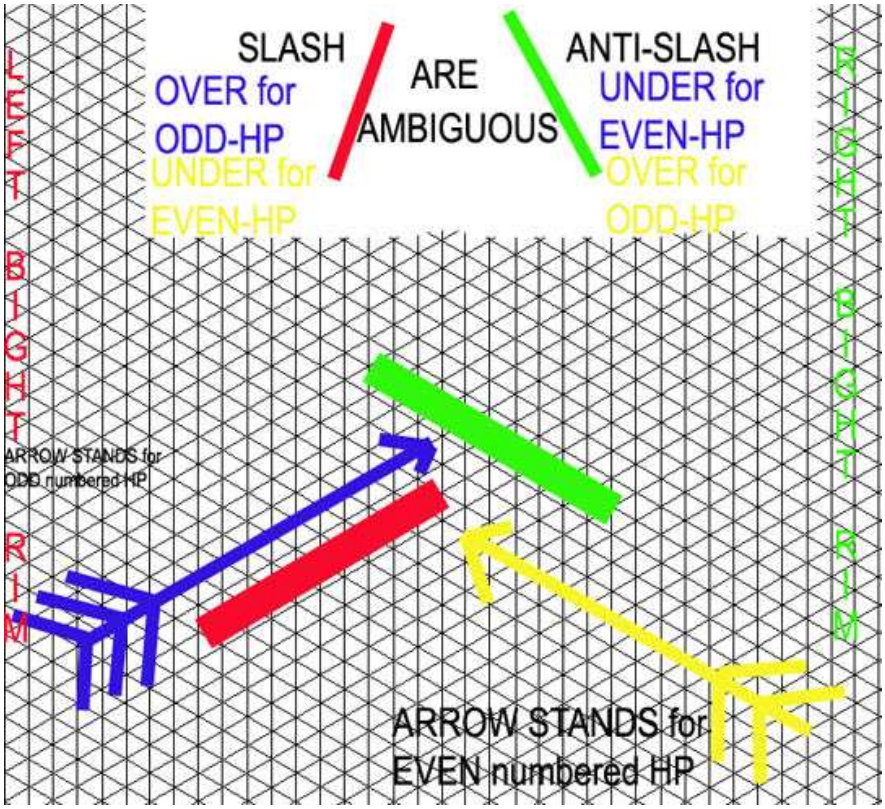
AVOID USING / and ** as symbols for crossings as they are **QUITE AMBIGUOUS except in drawings. (thanks to you Scott for your questions leading to improvements)

DO NOT them in writing coding **UNLESS** you state **PRECISELY WHICH TYPE** of HP is 'reading' them and **IN WHICH FRAME** of reference

ODD-numbered HPs move **LEFT** to **RIGHT** on horizontal mandrels.
EVEN-numbered HPs move **RIGHT** to **LEFT** on vertical cylinders.

HPs are not “just lines”, they are to be considered as **VECTORS** or **LINES WITH A DIRECTION**. **ARROWS** with point and feathers.

Fig 17



PART 8

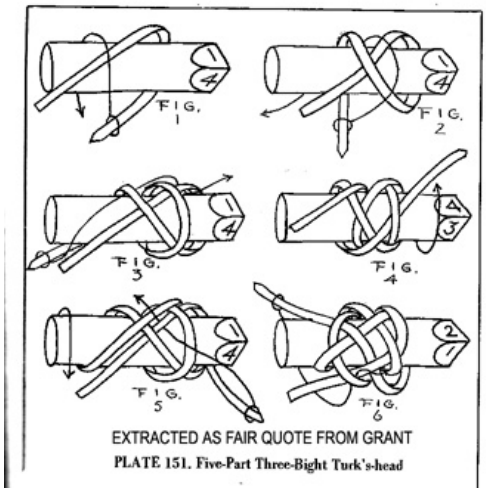
MANDREL versus CYLINDER (quotes from mails, so the style is rather unguarded but is was deemed better to keep the spontaneity, those not liking that option are under no obligation to read)

Q: . **[*open quote*]** To me a mandrel is a tool and a cylinder is a shape. In my humble opinion it would be less confusing to use cylinder only with a qualifier of horizontal bight rims or vertical bight rims. **[*end quote*]**
I may be missing something here and would appreciate you enlightening me if you will.

A: . **[*open quote*]** All this is a question of CONVENTION so it is ARBITRARY and serves to build a " common ground" …
ARBITRARY should never be automatically equated with SENSELESS or WITHOUT GOOD REASON FOR...

…the MANDREL frame of reference is used so as not to perturb persons knowing Schaake's work and because (other) Australian Authors use it too.
…
MANDREL : that word does not figure in my *CAMBRIDGE International Dictionary of English.*
… in fact a mandrel is a part of a machine … which is a piece for the lathe…

Fig 18



EXTRACTED AS FAIR QUOTE FROM GRANT
PLATE 151. Five-Part Three-Bight Turk's-head

To make things simple AND AS FAR AS KNOT AND BRAIDS ARE CONCERNED:

Mandrel is **SLIM and 'stick-like'.**
It **has** a small diameter compared to length.
Its length is many diameters large so being "slim' anatomically for the human hand the easiest gesture is to hold it palm downward (in pronation) and the 'stick' more horizontal than vertical.

See *Fig 18* fair quote from p371 of Bruce GRANT *Encyclopedia of Rawhide and Leather Braiding/*
** yes *Encyclopedia* and not as it should be *Encyclopaedia*.

Cylinder is STUBBY : its diameter is a large part of its length so anatomically it is best to hold it palm going a bit "upward" (in semi-supination.

Whatever the name you use there **WILL STILL BE TWO DIFFERENT FRAMES OF REFERENCE (VERTICAL & HORIZONTAL) TO KEEP IN MIND AND IT IS GOOD DISAMBIGUATION TO ATTACH A DIFFERENT NAME TO EACH RATHER THAN ADDING A QUALIFIER TO A SINGLE NOUN.**

Here is an idea from Jimbo The Kinky:
[open quote]Perhaps to include the notion of **"around the cylinder" vs. "along the cylinder"?** Somehow? [end quote]
…[***end quote***]

PART 9

THE WORD : CODE

IT MAY BE USED AS IN 'TYPE OF CODING' or 'CODE TYPE' or 'CODING TYPE' and pertains to the homogeneity of the nature of the crossings in ROWS and/or COLUMNS as shown in ***Fig 13***.

But some may be lost when it comes again as HALF-PERIOD CODE or CODING.

While in the case of ***Fig 13*** 'TYPE OF CODING' or 'CODE TYPE' or 'CODING TYPE' CLEARLY PERTAINED TO THE WHOLE KNOT here it is attached to the HALF-PERIOD, a small piece of the whole knot.

In ***Fig 19*** the HALF-PERIOD CODE or CODING is for the 18th HP so **EVEN**-numbered so going from **RIGHT** to **LEFT** this HP which does not have the complete collection of possible crossings for this knot so its CODE or CODING is **:**
U1 - O2 - U1 - O1 - U1 - O3 - U1- O1-U1 - O1-U2 but IN FACT the TYPE OF CODING IS COLUMN-CODED and its COLUMN-CODE, which, this time, MUST COME from a COMPLETE HP taken on a FINISHED KNOT, looks like:
O4 U2 O3 U3 O4 U2……O U (28 columns as it is a 29L)

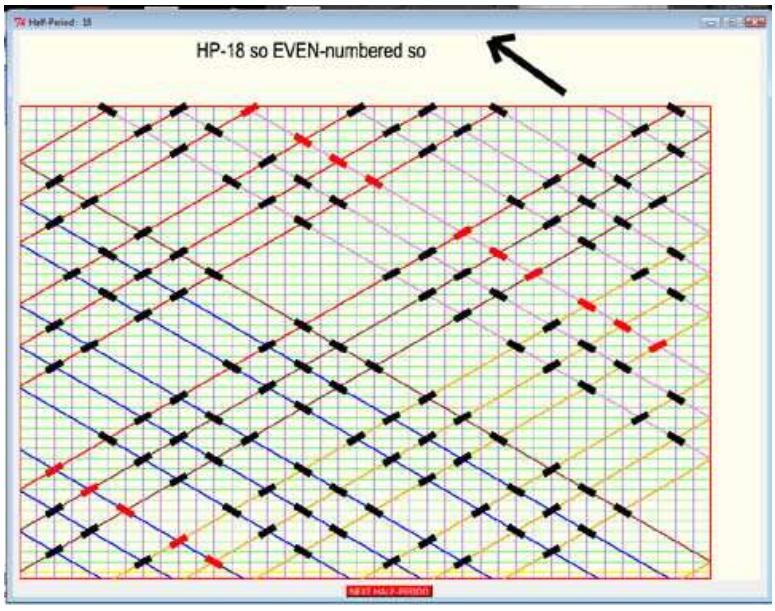


Fig 19

The TYPE OF CODING gives you the VISUAL PATTERN of the knot.
The HP-CODE gives you the MEAN TO LAY THE CROSSINGS IN A GIVEN HP

PART 10

MISCELLANIES (making use of existing illustrations which are quite deliberately used “as they are”)

Fig 20

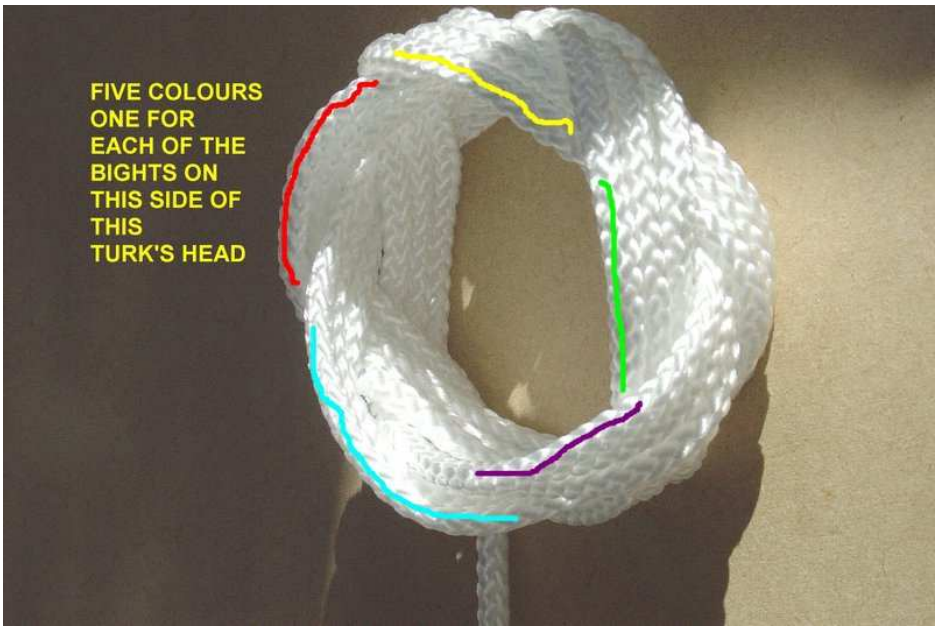


Fig 21

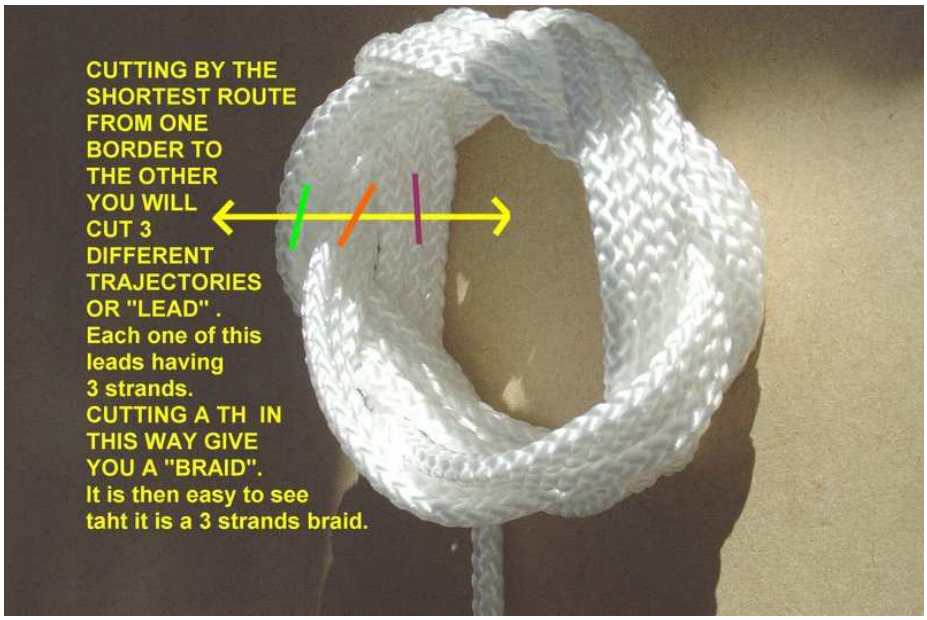


Fig 22


TAKING THE SHORTEST ROUTE
POSSIBLE FROM RIM TO RIM
YOU WILL HAVE SEVEN SEGMENTS
(either yello or violet)
THAT MAKES IT A SEVEN LEAD TH
NOTE THAT THE OUTER "LEAD"
ARE OF A " BIGHT " NATURE
THEM BEING ON THE RIM/BORDER
(note this is a 3 B TH)

Fig 23

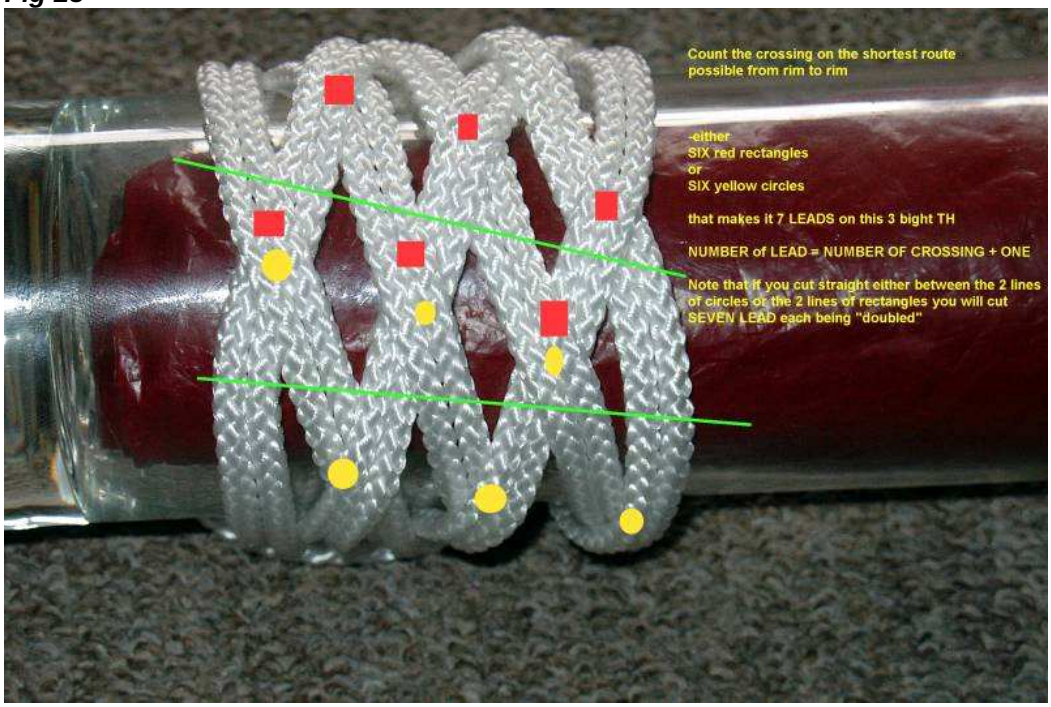

Count the crossing on the shortest route
possible from rim to rim
-either
SIX red rectangles
or
SIX yellow circles
that makes it 7 LEADS on this 3 bight TH
NUMBER of LEAD = NUMBER OF CROSSING + ONE
Note that if you cut straight either between the 2 lines
of circles or the 2 lines of rectangles you will cut
SEVEN LEAD each being "doubled"

Fig 24

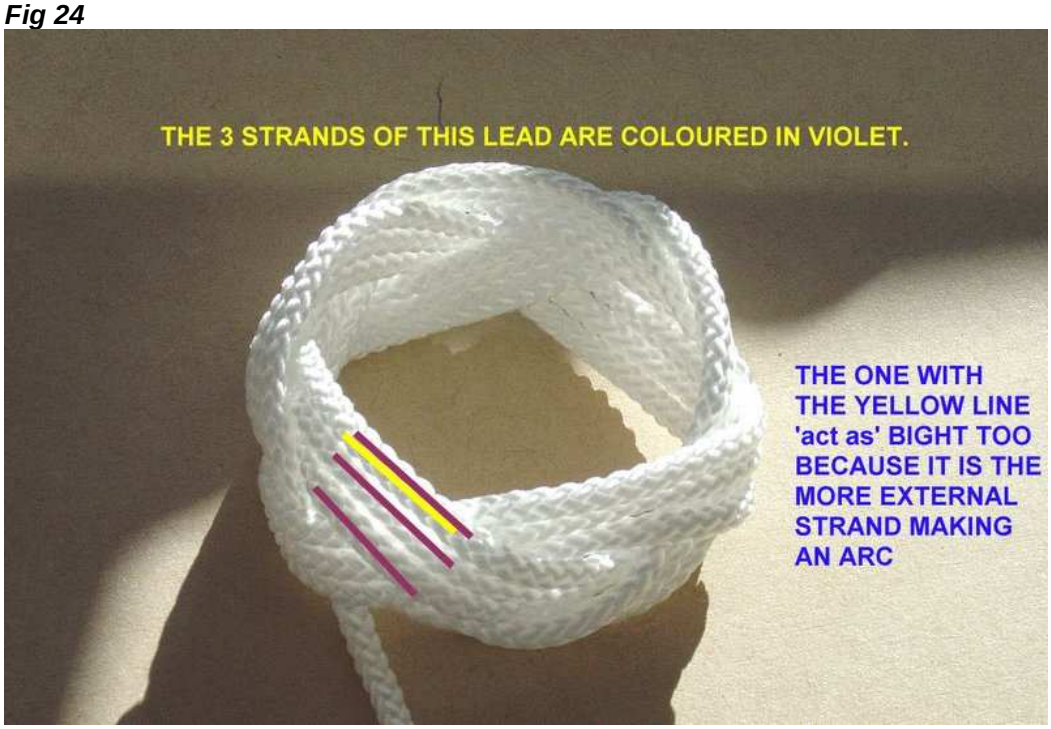

THE 3 STRANDS OF THIS LEAD ARE COLOURED IN VIOLET.
THE ONE WITH THE YELLOW LINE 'act as' BIGHT TOO BECAUSE IT IS THE MORE EXTERNAL STRAND MAKING AN ARC

Fig 25

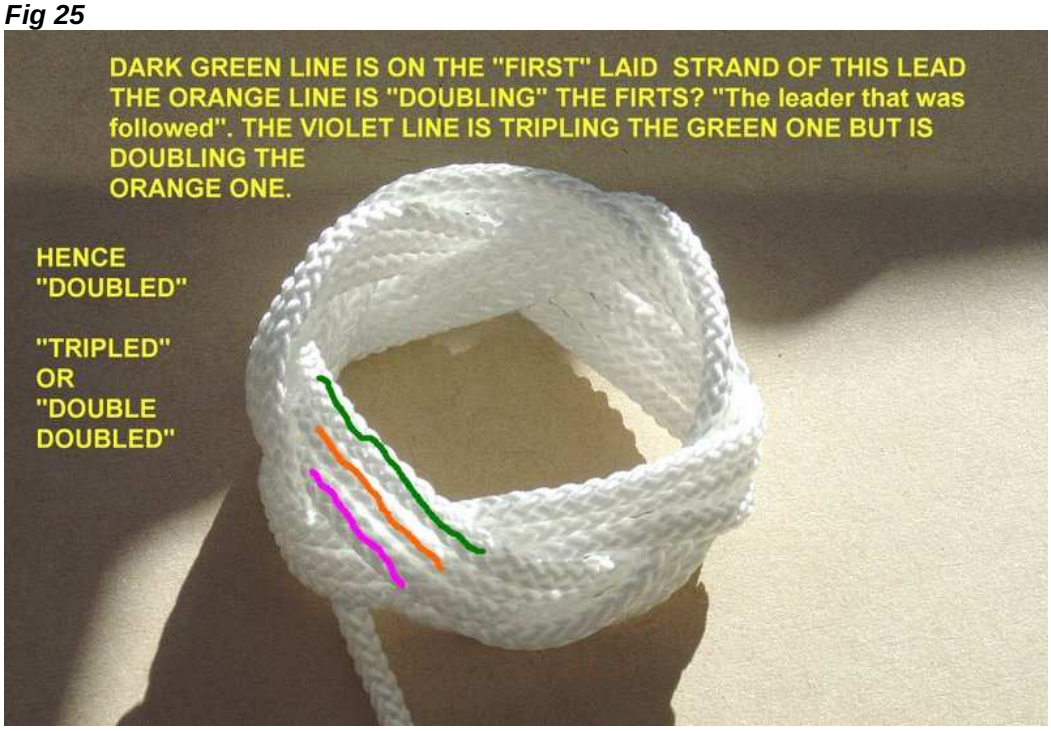

DARK GREEN LINE IS ON THE "FIRST" LAID STRAND OF THIS LEAD THE ORANGE LINE IS "DOUBLING" THE FIRTS? "The leader that was followed". THE VIOLET LINE IS TRIPLING THE GREEN ONE BUT IS DOUBLING THE ORANGE ONE.
HENCE "DOUBLED"
"TRIPLED" OR "DOUBLE DOUBLED"

Fig 26

A reminder about the way of numbering of PINS you have to comply with if you want to use the PINS NUMBERS INDICATION of RKnot Builder. I will let you ponder it.

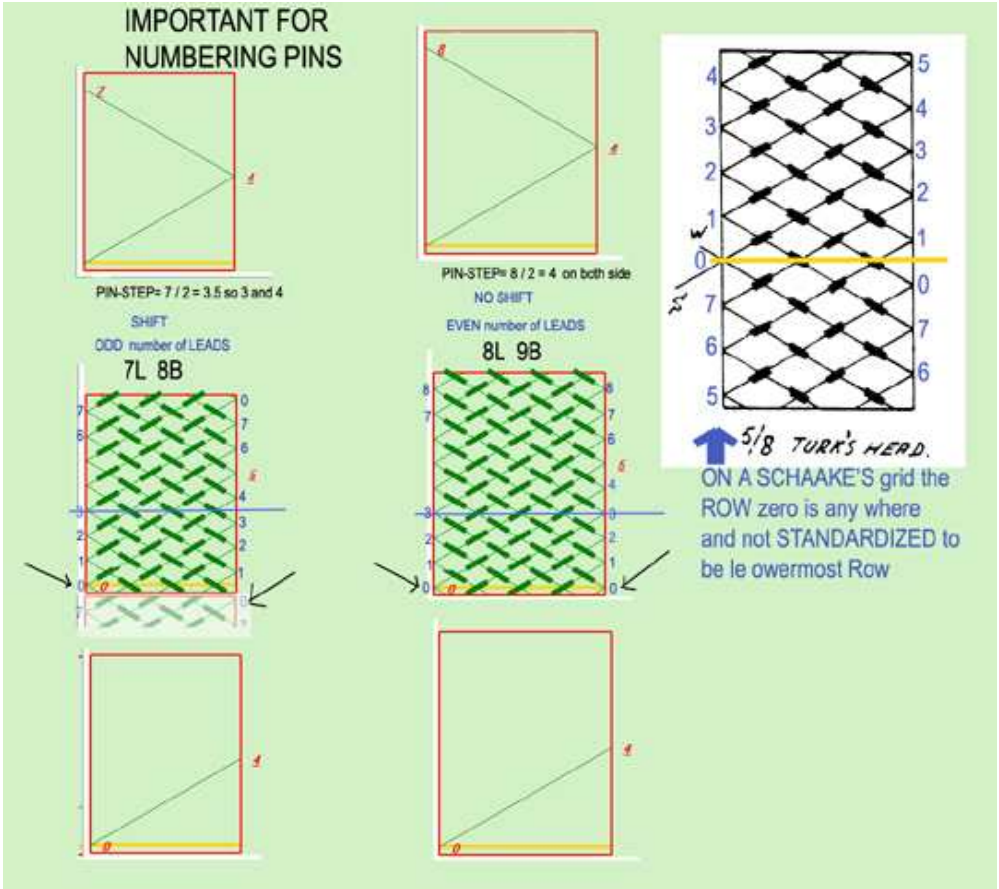


Fig 27

PART 11

THERE IS NO INTERSECTION IN A KNOT BUT ONLY CROSSINGS

Fig 28

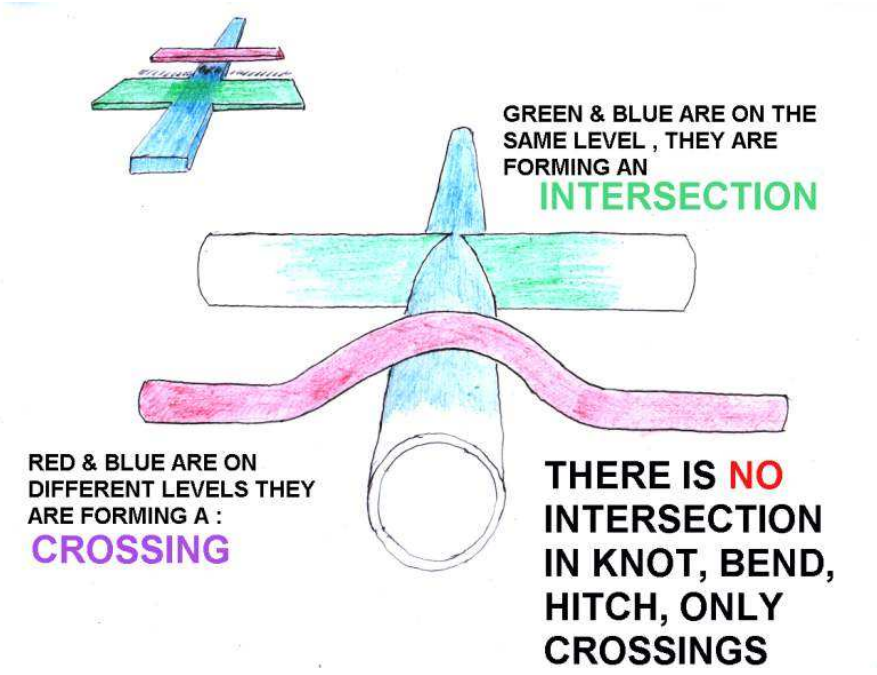


Fig 29

RAILROAD BRIDGE CROSSING A RIVER AND THE RIVER VALLEY

If wanting some writing describing and depicting on Turk's head and other regular knots and much more: just try your luck exploring (the shortest way) the Turk's head pages there
Direct: **http://tinyurl.com/233x43q**
Preview: **http://preview.tinyurl.com/233x43q**

For a **FULL EXPOSITION TO SCHAAKE and TURNER works** just buy (AND READ) a CD with 5 books (NOT *The Braider*)

BRAIDING REGULAR FIADOR KNOTS 173 pages

BRAIDING REGULAR KNOTS 127 pages

BRAIDING STANDARD HERRINGBONE KNOTS 209 pages

BRAIDING STANDARD HERRINGBONE PINEAPPLE KNOTS 203 pages

SPECIAL BRAID FORMS (Part One) 191 pages

US$ 15 payable to Dr John TURNER.
Instructions are to be found by those interested at either of those two links
http://tinyurl.com/2ubdabs
http://preview.tinyurl.com/2ubdabs

APPENDIX ADDED AFTER VERSION 3. 1. 0. 8
ADDITIONS OR MODIFICATIONS

FIG 1 The first tab

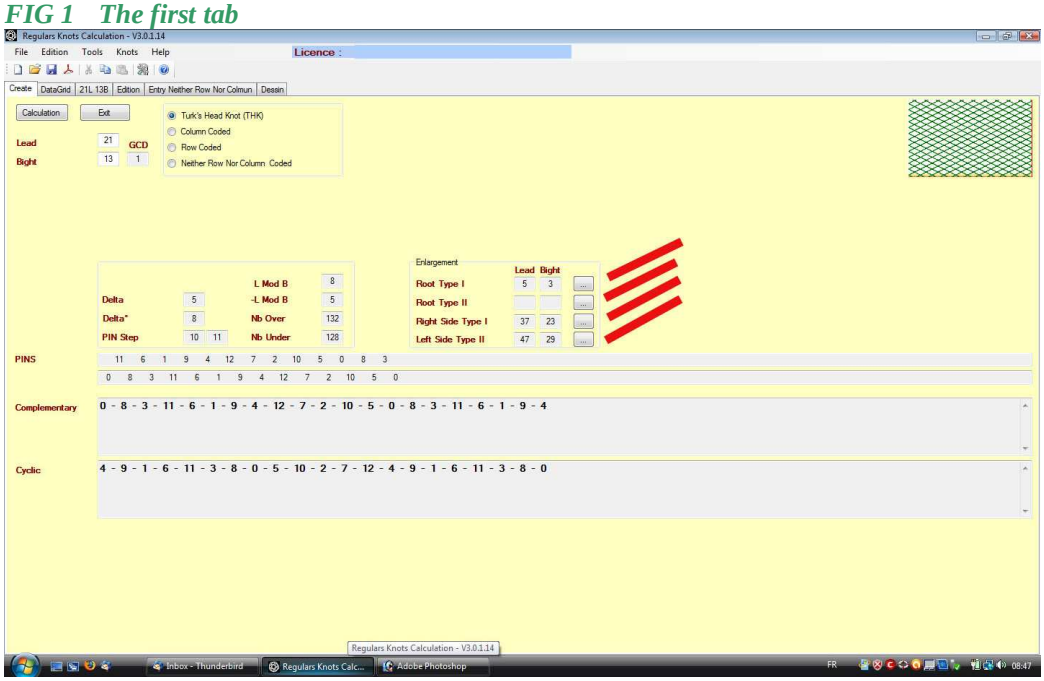


FIG 2

FOUR buttons that allow user to go up and down along the THK ENLARGEMENTs

FIG 3 The last tab

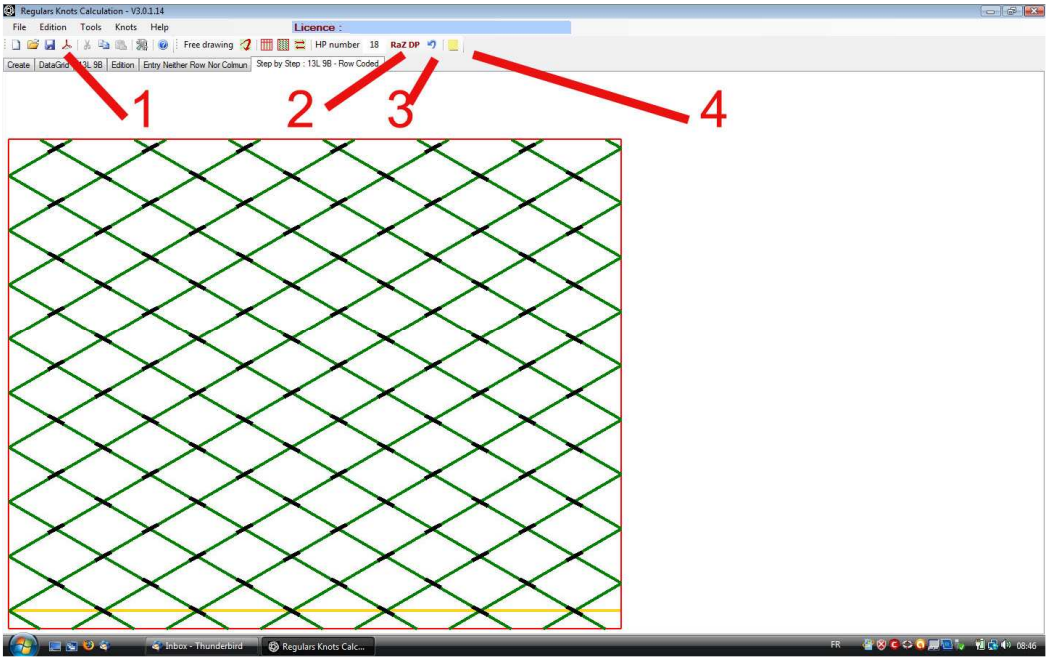
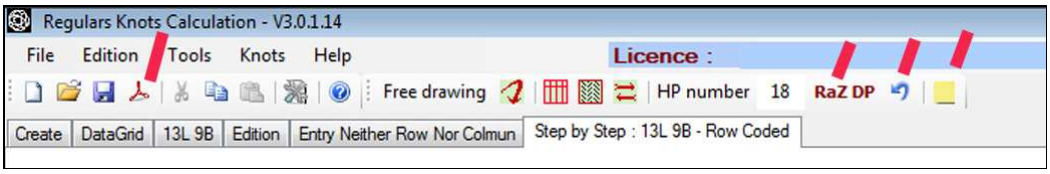


FIG 4 MODIFIED ICONS IN THE LAST TAB



First Note the way you can get a grid without obtrusive crossings : in the contextual menu choose the smallest dimensions for the width and length of the crossings. (That is why a new option was added in the contextual menu – see ***FIG 5***)

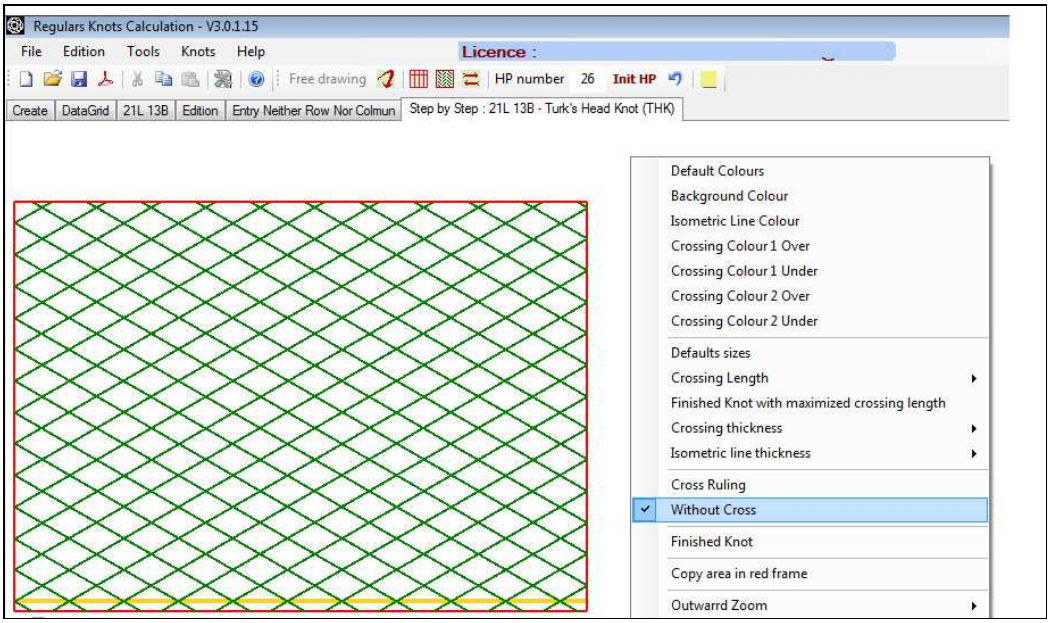
1 **PDF** This create a .pdf file in the Working Repertory (Configuration). This PDF contains the characteristics of the knots, the codes and the grid.

2 **Init HP** (put HP number to zero) This reset the HP number to ZERO

3 One of the two blue arrows icons was suppressed (the one for forward)

4 The **POST-IT** icon is now this one and in the text on the POST-IT now appears the whole count of **Over** and **Under** for the knot on the screen so that just a glance allow to know in which configuration user is.

FIG 5 New option in contextual menu



Checking this option **WITHOUT CROSSings** is « this session only » (until un-checking) as it is not saved in the Configuration file.