



# ROADPAC'14

**VIAAXI+**

Interactive horizontal Alignment design

***User Guide***

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## **1. Generally**

Program VIAAXI + is completely interactive program for projection of roadway axis and junction ramps in AutoCAD. At the moment of using this program, process of gradual substitute of 16-bit program HORAL and HORAL+ is finished, because it is not possible to support them any more. Program VIAAXI + is connected to roadway package through standard data files of type .XHB, .SHB, .SSS (files of main geometry points of road and chainage). Program VIAAXI+ requires installation of program AutoCAD in version 2002 and higher.

## **2. Review of new features**

Sequence of adjustments was provided. Continuously is program adjusted in accordance to new versions of AutoDesk products. (AutoCAD, Autodesk Map, CIVIL 3D.) Within principle features, newly added to program belongs especially:

- Implementation of new structure of data format of alignment geometry points .SHB
- Possibility to add the rotary element at end of alignment (graphical specification)
- Supplementation of output listings
- Linking and dividing segments of alignments
- Export alignment data to data format LandXML

## **3. Files of type .XHB and .SHB**

In package Roadpac, many years is working with axis format of type .SHB. With version Roadpac come to a new axis format. We speak about files of type XHB (format XML) where are saved data about fixed points and also data about connection of road beginning and end (when goes on ramp), text data with road name and project name and other data needed for package operating. The new format is necessary because definition of file SHB can neither be changed nor added in case of back package capability. In temporary period that can be long enough (roadway projects usually endure more years) will exist both formats XHB and SHB one next to the other. Full change to a new axis format .XHB at all programs should be done during the year 2004. During the work with files .XHB and .SHB it is necessary to know following information:

- First program VIAAXI+ proposes files \*.XHB for reading. In case that axis is only in previous format SHB, program always reads it (but is required to choose files \*.SHB in dialogue window). At keying in are always saved as files axis .XHB and axis .SHB.
- During reading files .XHB and .SHB is always controlled if files are identical (data about road). When a disagreement is found, program demands for users reaction.

Note:

Disagreement in file content can arise from counting alternately in programs SI12 and VIAAXI during making layout (SI12 can only change file SHB). Collision can also be caused after copying old files.

- Other programs of package ROADPAC work during temporary period with files of type .SHB. When only file .XHB exists and file .SHB is not in project directory, program creates it according to file .XHB it self.
- For possible hand conversion of file we have easy utility for disposal. This utility allows mutual transition of individual files or all directories with more files SHB or XHB. When temporary period finishes, format .SHB will be gradually eliminated from usual operation.

### **Caution - New data format of SHB a SNI files**

From the start of the year 2006 was a new data formats of SHB files and SNI files implemented, due to required actual increasing precision of some alignment geometry points values specification. Current Roadpac system installation kit, since 12.06.2006, contains programs working with these new data format (SHB, SNI) archive files only.

Full feedback compatibility is ensured - new RoadPAC programs are able to read new and old SHB and SNI data format files, but to create new files only. If you re-install your RoadPAC from actual installation CD, no turns would be registered by the users while handling with system RoadPAC. Re-installation must be done on all company computers indeed.

Troubles during data file interchange with whichever companies which have not upgraded Roadpac yet, would be occurred. Old type programs RoadPAC don't read well the new type files and an error will occur while reading. In transition period following proceeding is recommended:

If you will share the alignment data (vertical and horizontal) with somebody who has not upgraded Roadpac yet, hand down both files SHB/XHB and SNI/XNI principally. Data files XHB and XNI correct reading is always ensured both by old programs and new programs in any cases. User is able to read alignment by old versions of VIAAXI and VIANIV programs and by the simple save the old type data format of SHB and SNI will be stored. On this account are no conversion programs for interchange between old and new types of alignment files SHB a SNI available.

Please, recommend to your partners who are still using old data format SHB and SNI to upgrade their RoadPAC as soon as possible.

## **4. Convention and settings of AutoCAD**

### **4.1 Work with layers of AutoCAD**

Program VIAAXI+ hasn't got special requirements on use layers of AutoCAD. Design elements of roads can be prepared in any layer of drawing. During working program uses and automatically serves layers put bellow.

Attention, program deletes these layer during the work so never save data that are not related with axis design and that should be kept.

**RDPC\_VXX\_ACTIVE\_ROAD** into this layer program draws design elements of active road. Operation is automatic, program deletes layer it self at transition to other active road.

**RDPV12\_RUBBISH\_BASKET** this layer is hidden and is used as working. Attention, neither content nor all layer can not be deleted

**SHB\_name\_road** to this layer program draws axis shape from file of type .XHB when it is necessary for orientation at junction design. Operation of layer is automatic, layer is deleted in advance at every calculation. Individual layer is created for every road that has got file . XHB in working data directory. View of individual axis e.g. at junctions is lead by menu **View / List of roads**.

*Warning, don't mismatch these layers which are intended for alignment design by VIAAXI with those which are intended for layout drawing by RoadCA7 functions.*

#### **4.2. Cooperation with package RoadPAC**

Program VIAAXI uses standard communication file of package RoadPAC (file CONFIG.RDP). In this file there are saved information about active road and relevant data directory. File CONFIG.RDP is continuously updated during the work.

In case of need can be updating of file CONFIG.RDP switched off and files will be read and written according to usual convention of Windows.

#### **4.3. Coordinate packages**

Program detects setted coordinate package of AutoCAD and uses it. In case usual work with coordinates (package JTSK) which means that drawing of current layout can be in 3. quadrant as common today. Before switching on the program it is necessary to sett local coordinated package so it is turned for 180 degrees around axis Z.

#### **4.4. Bases**

It is possible to trace directly to existing drawin in AutoCAD (with respect on layers stand above). It is always recommended to attache a base bellow drawing where is tracing as reference for protection and easier manipulation.

### **5. Menu description of ROADCAD/ VIAAXI**

Menu of program VIAAXI is separated into two parts. The first menu named ROADPAC is unit for all systems above AutoCAD. Basic menu items are following:

Settings of program (RoadCAD1, ..., VIAAXI +) obtain switching over programs.

Setting of active road allows change active road of system from this level.

Setting of coordinates system allows set requested coordinates system (world coordinates system or JTSK). Attention, this setting must be done before opening the

road and during the work cannot be changed. Setting saves in the same time as drawing so at repeated opening of drawing does not have to be repeated.

To this part another new functions will be added that are unit for more programs of package Roadpac.

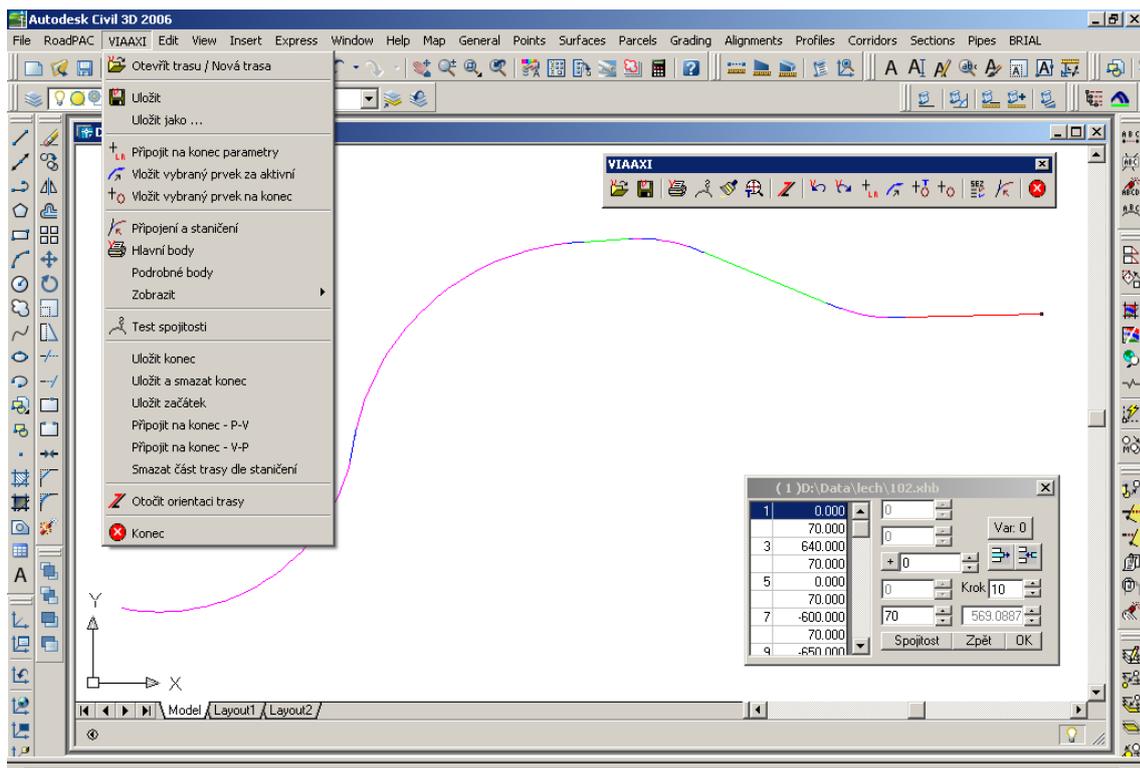
## 6. Menu and toolbar VIAAXI

### 6.1 Generally

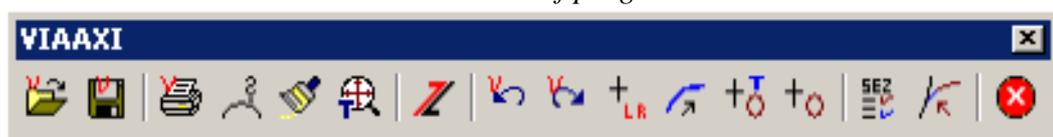
For work with program there is individual menu named VIAAXI in AutoCAD for disposal. Practically all commands are duplicated also in toolbar VIAAXI for easier operation of program.

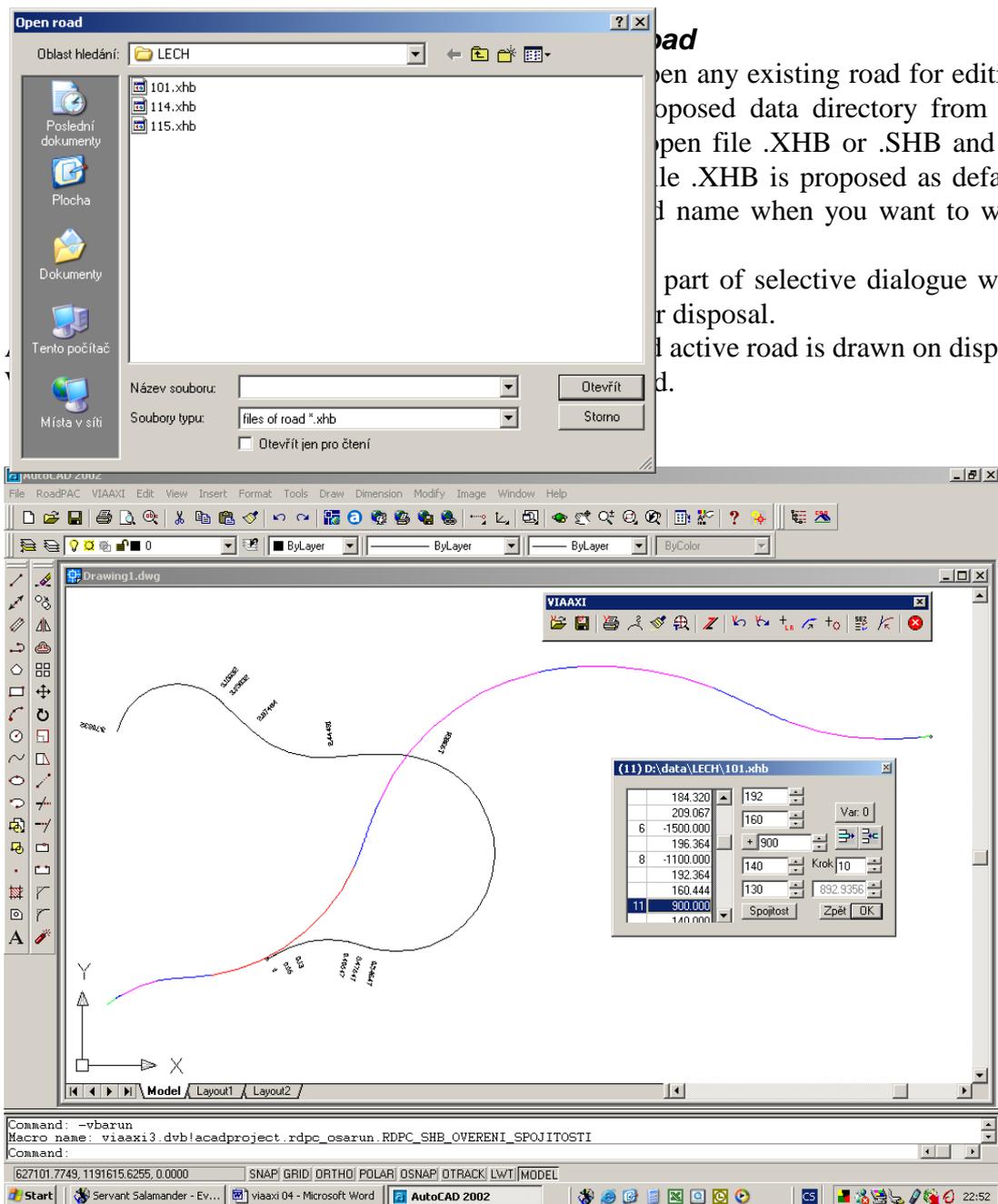
Attention, toolbar is displayed only at switching on program VIAAXI+ and has got all attributes as standard toolbar of AutoCAD. At ending work of VIAAXI+ is toolbar automatically hidden. Most of commands are put as into pull-down menu so into toolbar. For well arrangement are first described commands of toolbar and then commands of pull-down menu that are not put in toolbar not to increase its size.

*Pic. 1 main handling elements of program on the screen*

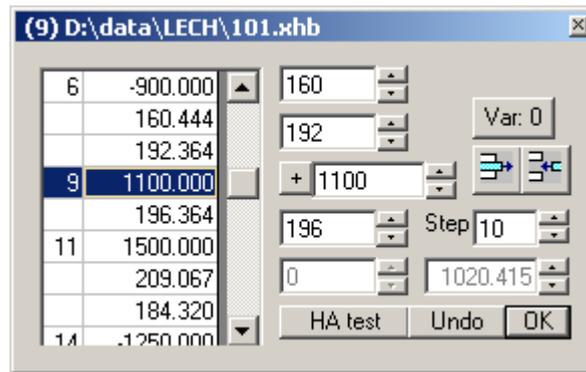


*Pic. 2 Main toolbar of program*





Control panel for data is modified into as small as possible measurement so it does not hind on display during the work. In its left part there is well-arranged table of road elements and lengths of transition curves. In the middle part there are elements for handling transition curves and ratio element. It is allowed to key in numbers into relevant window or use arrows to change values at exact work.



By button Continuity check if the road is continuous. No continuous road can be created by import of older data from programs RP12 or RP14, or from program INPAC

In right top part there is button for switching over variants - in many cases of task there are two right geometric solutions. When unusual curves are created (they are accessories requested solution), by pressing this button use second solution.

Button Delete and Insert, known from program Excel, use to delete active element or insert element behind active element.

Button Step use to set step as common value for all number data, it can assume values 1,10,100 or 1000. In case of moving chainage at connection can step assume also value bellow 1 m (0.1 or 0.001 m).

Number data on the bottom right indicates length of active element. Usually it is not accessible. Element length can numerically be changed only where it makes sense (last road element).

Button Back allows return the calculation back till beginning of calculation.

Button OK confirms keyed numerical values. Mostly just click by mouse on any other field and keyed value is accepted and also recalculation is done.

### 6.3 Save and Save as

Program saves existing road. File .XHB is created and its matching .SHB. Work of program is not finished, road stays active and open for editing. Function While SAVE AS is optioned, user choosing except the name of output file the extension too.

Program VIAAXI is able to store alignment to Land XML data format style for easy data conversion to other program systems.

### 6.4 Protocols

Program writes standard printing configuration of the road into the file and views it on display.

### 6.5 Control of continuity

Use this button to check the continuity of the road. Not continuous road can arise at import of older data from programs RP12 or RP14, possibly from program INPAC.

At calculation of VIAAXI+ should not arise any incompatibility. When incompatibility is found, it is necessary to eliminate it. The best way is to eliminate it by calling recalculation of road on element that reports error (e.g. change of ration about 1m there and back).

### **6.6 Redraw**

Program allows automatic redrawing of active road at calculations. In case that overdrawing of road was not done, use button for overdrawing active road including symbol of roadway beginning (small circle).

### **6.7 Zoom of active road**

Program sets the view on display so is viewed all active road with small reserve in edges.

### **6.8 Turn chainage**

In some cases is necessary to turn chainage of road. Press the button to turn order of elements and chainage on road is changed. Function use e.g. when you want to add another elements on beginning of the road or when you find out that element is arc (curve) oriented to different direction as requested. Beginning of the road is marked by small circle on first main point of the road.

### **6.9 Undo**

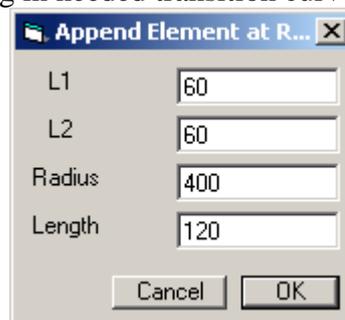
Program VIAAXI+ saves all steps of calculation into memory. So it is possible to go back in calculation as far as beginning of the calculation.

### **6.10 Redo**

Function allows to reinstating one or more steps after execution of function Undo (Back). It depends on operations that have been done during.

### **6.11 Add element to the road end with use of parameters**

Function allows add element that is keyed by its radius and length to the end of road. Temporary allows keying in needed transition curves.



### **6.12 Insert element behind active element of the road**

Function allows insert element to the road. Draw requested element in AutoCAD (straight line or curve) in right position behind active element; choose it in AutoCAD and press relevant button. When task has geometric solution (this operation is very

sensitive on logic correctness of solution so on precision), element will be inserted into road behind active element.

### 6.13 Insert element to the end of the road

It is Basic function for road creation. Draw requested element in AutoCAD (straight line or curve) in right position; choose it in AutoCAD and press relevant button. Element will be put to the end of the road as rotary element, it means with respect on last keyed point. Orientation in circle elements is solved so the point laying nearer to the end of the road is taken as first.

### 6.14 Insert element to the end of the road –fixed element

Draw requested element in AutoCAD (straight line or curve) in right position; choose it in AutoCAD and press relevant button. Element will be link on the end of the road as fixed element it means with respect to specified location. Orientation in circle elements is solved so the point laying nearer to the end of the road is taken as first.

Previous element (last before proceeding) will be consider as free element.

*Notice:*

*In case then two elements are specified only, next(second) element will be always consider as rotate element in the act of this type of task.*

### 6.15 View list of roads

This function controls viewing roads from files .XHB or SHB. It shows list of existing roads in files of type .SHB. In table tick axis that should be drawn and by button Draw update data on display. Draw

View all ticked roads. Roads are drawn in individual layers with name „SHB\_nameroad“.

#### Draw +Z

The same but simultaneously is performed zoom of display so all chosen roads are displayed.

#### Hide

Hides already chosen and drawn road

#### Save choice and Open choice

List of chosen roads can be saved and load back to the file, standard of widening filename is .XTRS

#### Zoom road

Modifies zoom the active road so is viewed.

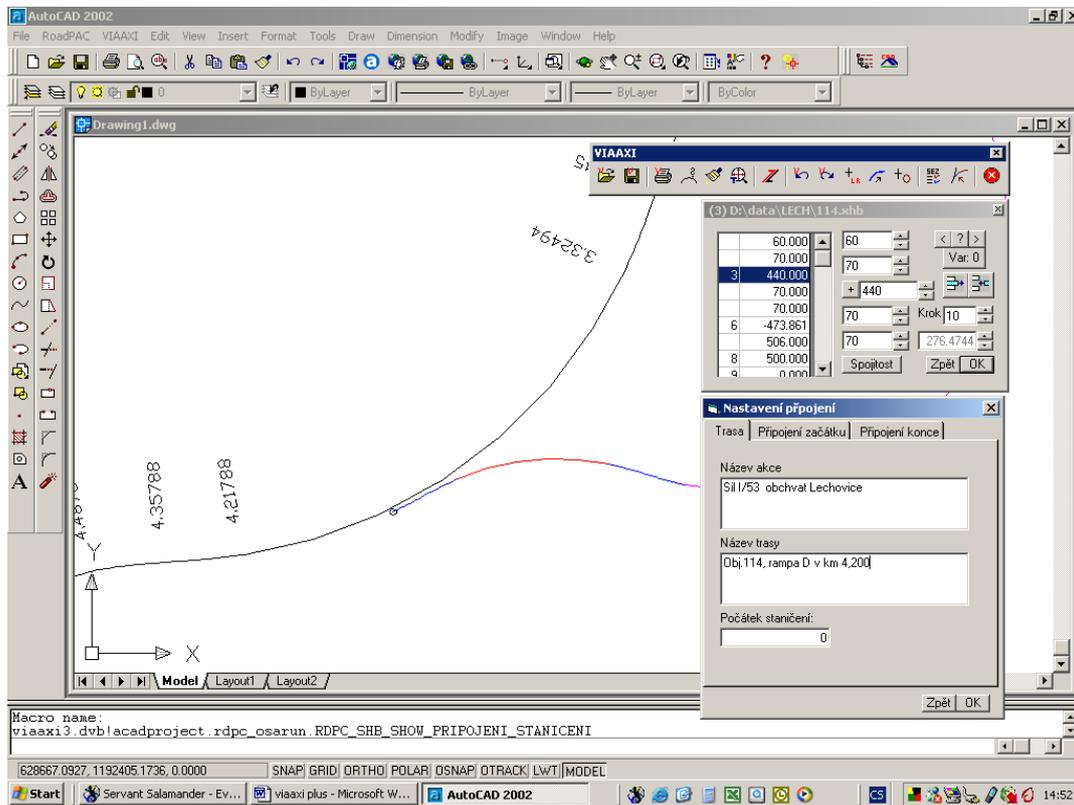
#### Close

Finishes dialog of viewing.



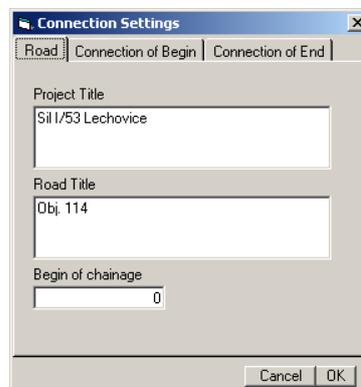
## 6.16 Chainage and connection

Program VIAAXI+ practically does not make difference between common road axis and axis that is on one or both ends connected on other axis. In file .XHB are saved all data defining connection of axis on other axis together with own data about main points of axis. Press button Chainage and Connection to view other dialog panel placed always under the basic editing panel. This panel has 3 carts.



### Road

On this card key in chainage of the first main point of the road if it is not 0 and than texts Project name and Road name that are printed in header of output configuration.



### Connection of beginning

For connection are keyed following data:

Main road key road name to that is road connected. It is possible to choose any valid road directly from combo box.

Connection tick that road is connected on the road and whether is connected in or opposite the direction of basic road chainage.

Shift shift ramp from main road keys in according to direction of basic road chainage.

Diversion tangent of ramp in point of access is not equal tangent of main road, but under given angle, key in diversion angle of road from main road

### Approximate point of connection

For right connection must be also defined position of the connection point on the main road. It is allowed to key in main road chainage, element number according to listing or directly point coordinates. Press button "!" to key in point directly on display.

### Procedure at creating the connection

- Create first element of road with connection and key it as at classic road. Also is allowed to use already existing road - choose first element of the road as active element (connection for all existing roads can be defined)
- In table of connection key in requested data and press OK on panel of connection and also on basic panel of dialogue
- In case that road has not been connected, tray to change a little bit the element radius (for one meter there and back)
- Key in requested coordinates on road beginning.
- First road element conducts as rotary element - counts parameters of connection and road is connected.

### Connection of end

At connection of road end proceed similarly as at connection of beginning. Last element rotates around the first point till the connection point is found.

### ***Fine-tuning chainage connection***

Program VIAAXI+ allows use also other type of connection. Create ramp germ with one element and connect it. As soon as you are placed on connecting element, in top part of basic dialogue panel are viewed arrows. Use them to move point of axis connection, in the process the first element of connected axis works as build-in, it means that connection glides on the axis. In this case can possibly be step of the shift set on values below 1.

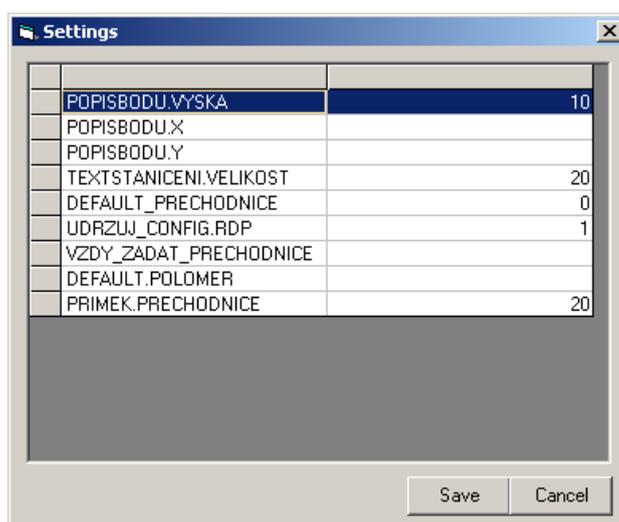
### **6.17 End**

Determination of program work

Function accessible only from pull-down menu:

### **6.18 View settings**

Program shows table of some parameters default settings. In case of need is allowed to change these parameters. We usually speak about description points heights, default values of radius and coordinates into dialogue panels.



### **6.19 Roads connection and separation**

Program VIAAXI+ allows create only continuous and correct roads. In many cases is necessary to separate road into more parts, continue in setting out of variant or opposite connect road from some parts. For this role is designed group of function, used only from pull-down menu:

Save end program creates a new axis that begins with actual element and ends with end element of axis. As active stays original axis without change.

Save and delete end program saves axis end as a new name and deletes it. As active stays original axis from first till actual element.

Save beginning program saves road beginning till actual element as already used name. As active stays original axis without change.

Connect to the end - free program connects other road to the end of the road, defined by file .XHB. First element of second road will be processed as free element that will be counted up.

Connect to the end - fixed program connects other road to the end of the road, defined by file .XHB. First element of second road will be taken as fixed element, last element of the first road part will be counted up.