PRAGOPROJEKT

ROADPAC 14

PROGRAM RP56

Drainage of subgrade

USER GUIDE

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1 Program features and principles used in their solution

PROGRAM RP56 - drainage of subgrade

1) Previous Program RP51solves the corridor cross sections along the alignment, while on formation defines the location of maximum 4 drains : two on the outer edge of the formation and one to two in the central reserve in case of dual carriageway roads. The program RP51 calculates upper levels of drains placed on formation only. The program RP56 task is intended to design depth of drains and levels of its bottoms, so as to ensure drainage of formation with required slope of bottom.

2) The RP56 program runs after the runtime RP51 works with file .SPR in which is stored the results of RP51. It will used for first determine of bottoms levels, and depths and widths of drains, or for additional repairing of drain bottom levels. The resulting bottom levels and drain widths are saved back to the corridor cross section file .SPR.

3) Input data are entered into the RP56 form and are saved to a file align .V56. Files .SPR and .V56 always have a common base name "align".

4) Upper width and location of drains inside of formation is entered in input data of RP51 program. By RP56 program can no longer be changed. Bottom width of drains is entered by input data of RP56 program. Bottom width should not be less than upper width. Two widths can be specified, which may differ: width bottom of drain in formation (outer drain) and the width of the bottom drain in the central reserve.

5) Drains levels are entered in several ways, which are prioritized:
   • highest priority has specified levels (coordinate z) given in the form of broken polyline
   • The second priority is given to levels derived from depth of drain, which can be entered differently for certain chainage segments and for different transversal positions in cross section (Marks for positions indication - from left to right: LL, LR, RL, RR)
   • Third priority is given to levels of the bottoms, which are already stored in the file .SPR by a previous run. It is applied if there are no levels specified by any of the methods described above. This type of specification allows only partial repairs in a few cross sections on the otherwise fixed road.
   • The fourth priority has absolute defaults: width 0.40 m, depth 0.40 m

6) Program checks and provide automatic correction of an erroneous entry

7) Graphical check of the consistency of a bottom drain gradients is provided

8) Print of report results and listings is created

2   *Specifications form of program RP 56*
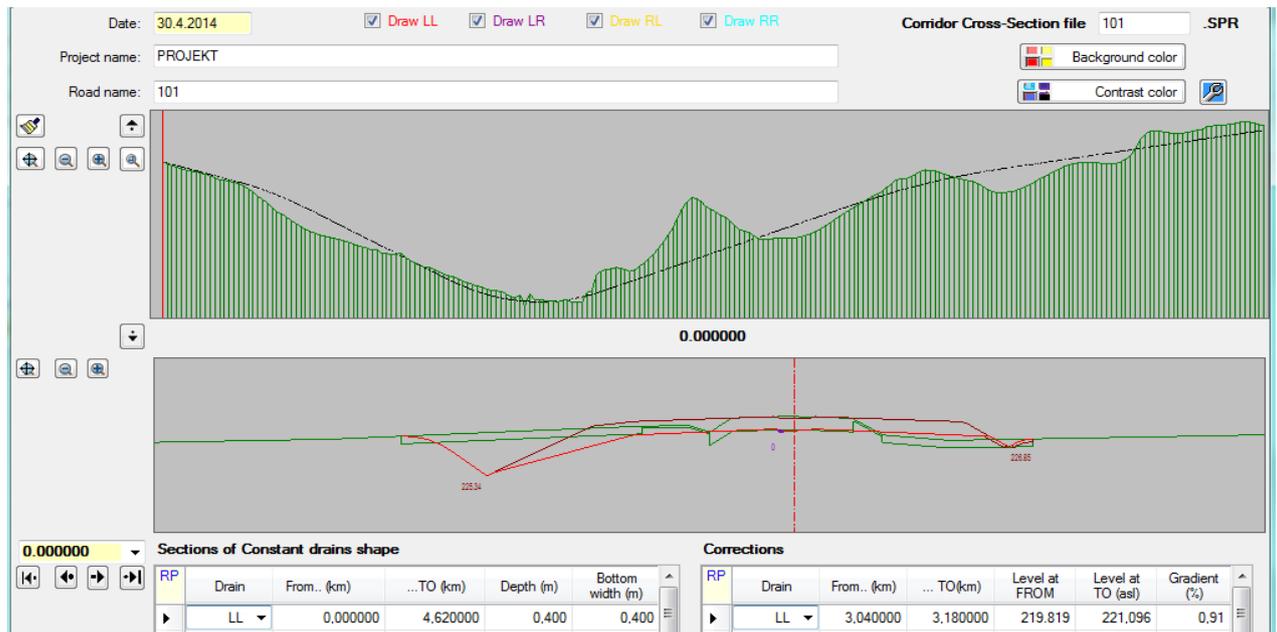
The form contains control data, two picture boxes (longitudinal section and cross section) and two tables: **Constant shapes of drains** in segments and **Corrections**

Meaning of items

Date is the date of the input data.
Project title and name of the alignment are arbitrary texts to be written in the header of the output print reports and files.
Cross sections: SPR
is the base name of the alignment .SPR file. It may not be entered. Program assumes the default filename 'align' from the main menu itself

Upper graphics array - longitudinal profile
Displays the profile and existing terrain profile (both taken from the SPR), and four colored bottom drain profiles. (Used colors: red for LL, LR blue, yellow RL, cyan for RR.) By the appropriate switch can be activated one drain to draw only. Right / left mouse button in the upper graph can activate a highlighted cross section that is simultaneously drawn in the lower graphic field. Chainage of this cross section is entered in the appropriate combobox automatically. (The option of cross section can also

be done directly by selecting the combobox value, or by use sliders). Scale and zoom can be handled by the standard icons, or by middle mouse button. (Wheel) The upper band image marked color-highlighted sections where drains has not corresponding gradient according to standards. (Gradient is less than 0.5%)

Lower graphics array - display cross section
Simplified roadway cross section and terrain is displayed. Colored all the 4 drains are also displayed, if they exist in the cross section, with bottom levels description. Scale and zoom can again affected by the standard icons and mouse buttons.

Table of Constant shape of drains in segment:
> In each row of the table are written default values of bottom width and depth of the drains. The table is evaluated for each row from top to bottom. It means that if segments overlap the last row with the valid data will be applied. On the first row are therefore usually specified data valid for the whole road. (This range may be encoded from 0.0 to 0.0) On the next rows an individual adjustments can be specified then.

Select drain
> selects the location of the drains by code (LL, LR, RL and RR). A blank entry applies to all four drains.
> **From (km)**
> the chainage beginning of the section (km)
> **To chainage (km)**
> the chainage end section (km)
> **Drain depth (m)**
> **Width of the drain bottom (m)**
> Data from this table shall be applied according to the principles of task priorities (see Introduction)

Table of corrections:
In individual rows are entered start points or end points of the vertical polygon (Chainage – bottom level). In order to specify the angular polygon, then they should end /start points of the polygon to be continuous. (Program it does not check and does not repair an error, however, error will be seen in the graphic display). The table is evaluated from top to bottom. It means that if there is an overlap of polygon segments occurs, the last row with current data is valid.

Select drain
selects the location of the drains code (LL, LR, RL or RR). A blank entry data cannot be used.

From (km)
the beginning chainage of the polygon segment (km)
to chainage (km)
the ending chainage of polygon segment (km) (for numeric input these points may not lie in the cross sections position).
Level bottom from (m)
Level bottom to (m)
Data from this table shall be applied according to the principles of task priorities (see Introduction)
Gradient (see graphic edit of drains)

Standard Buttons: Calculation, View, Exit and Cancel.
After opening the form the bottoms of the drains from the SPR are displayed, if

contained therein.

After clicking on the **Calculatio**n button ongoing calculation will be done using current data. In the longitudinal section is shown drain bottom level profiles again, stored in the SPR work file (This file is not stored in the user directory!)

After clicking on the **View** button the protocol of this ongoing calculation is displayed.

After clicking **Finish,** the calculation of the actual data carried out in the user directory, the current data is stored in the user´s directory. Form is closed then, the resulting protocol is no longer viewable only from the main form.

Click **Cancel** the original state of SPR file is restored and also input data V65 in the user directory.

Graphical input of polygons into a of corrections:
Polygons of drain bottom may enter and repair numerically in tables, or graphically using function. .
Click on the key will allow the user to graphically edit the position of the bottom drains. Editing is allowed only for each type of drainage separately (LL / LR / RL / RR). This setting will force the program as follows:
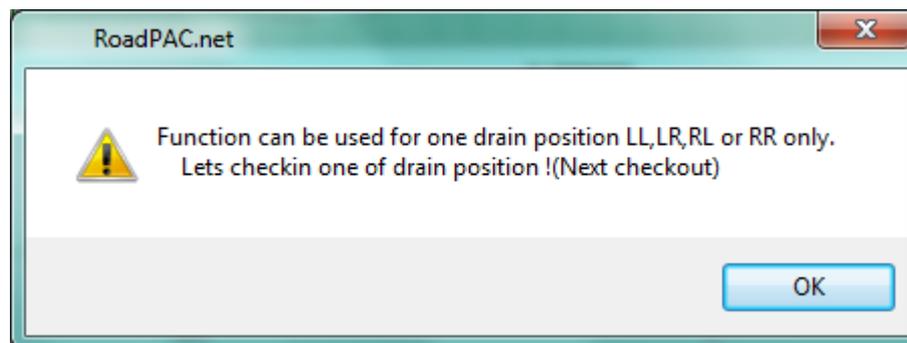

This function is enabled when the table turns over two checkboxes:

RP	Drain	From.. (km)	... TO(km)	Level at FROM	Level at TO (asl)	Gradient (%)
▶	LL ▾	3,040000	3,180000	219.819	221,096	0,91
	LR	3,000000	3,180000	218.201	221,053	1,58

Sets the position of the left vertex of polygon side (check in the left checkbox) or right end (check in right checkbox). It must be selected in the table an active row at the same time. (Neither the closest free for the entry or any occupied for repair).
For further process it is now important to clarify the response to various combinations and methods of push of the mouse buttons. These reactions are the same for the whole application.

When the compression of the right or the left mouse button while moving over the upper image of a longitudinal section is permanent, on the top bar of the form chainage and the projected height of the current position of the mouse cursor is displayed. If any drain occurs in this position, is shown with its longitudinal gradient in % in the corresponding textbox. When is cursor moving over lower image in the textboxes are shown offset values + / - from axis and appropriate level. Transfer between the upper and lower image are briefly made by clicking on the image area by middle button.
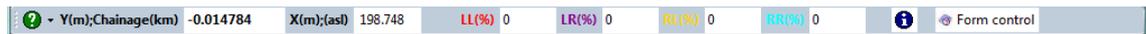
The mouse wheel is reserved for shifts as Paw (By permanent pressing and releasing the button) and zoom + / - (by spinning wheel)

When the left checkbox is check in and is released other than the middle mouse button over the upper picture in a certain position the cursor snaps to the next of the nearest chainage and reads in this level and chainage of drain. (The user should not hit them directly to the chainage, but between cross sections.) Values are written in the table in columns 1, 2 and 4
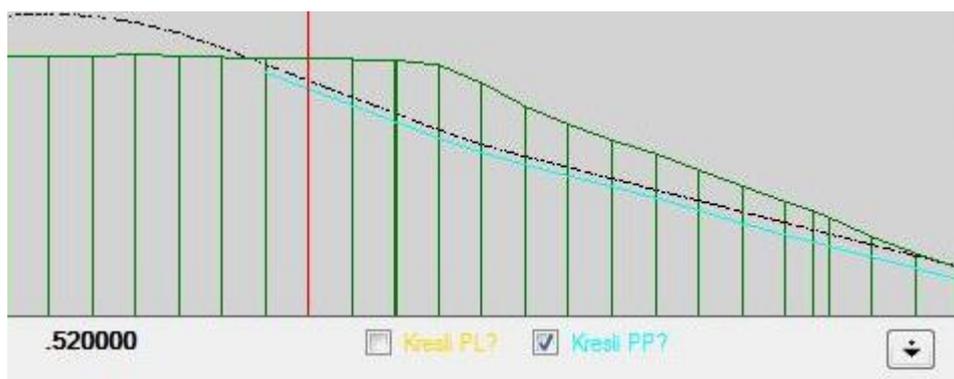
When is the right checkbox checked and is released other than the middle mouse button over the upper picture in a certain position the cursor snaps to the next of the nearest station and reads in its level and chainage of a drain. Values are written into the table in columns 3 and 5. User should point to places where the selected drainage (LL, LR, RL, RR) occurs only.

It is then up to the user to correct levels so as to meet the standard gradients. Click in column 6 (slope), the user can check what the current gradient of drainage is. Indication of the gradient is not recorded anywhere. It is up to the user to proceed with editing of individual drainage in the direction of increasing chainage left to right, and the sides of the polygon logically follow. Chainage FROM must always be less than chainage TO, a break in the polygon must be broken down into two rows.

3. *Description of output listing*

Output printouts is generated during the program run in file 'road'.L53. Its printing can be controlled from the main menu of the RoadPAC.

Includes:
• an annotated copy of the input data from the V56,
• information about the input file (the file "align" .SPR in this case)
• Overview of drains levels in cross sections (width of the bottom, level in formation and bottom drainage level and gradient of drainage in the bottom section. Gradient in the cross section usually corresponds to two adjacent bottoms segments, if there is a break of gradient the average gradients of two adjacent sections is printed.
• List of the lower drainage bottom levels in section (where it is necessary to ensure Outlets). The list includes: the chainage, position code (LL, LR, RL, RR), level of bottom and type, either in terms of the lower end of the drainage, or a place with a minimum level.