



ROADPAC'14

PROGRAM RP53

Drawing of corridor cross sections

User Guide

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1. Introduction

Program RP53 Corridor Cross sections drawing is part of ROADPAC system. It is used as one of the last program of program suite for corridor cross section processing.

1.1 Program features

The program is designed to produce graphical output of corridor cross sections stored in SPR (corridor cross sections) file. The program creates images stored in Plotfile file type. This file can be plotted both on graphical display and on plotter. The calculation must be preceded by run of program RP51 Corridor Cross sections construction that creates the SPR file (corridor cross sections). This file contains all data items in range of construction limits, include geological conditions.

Program SI53 draws corridor cross sections in harmony with Articles 29 to 33 of the Czech National Standard (CSN) 73 01 40 - Drawings of roads:

- 1) Terrain surface in cross section and marking of old pavement thickness by thin, continuous line, green colour.
- 2) Stripping of topsoil by thin dashed line, green colour,
- 3) Centreline of proposed road by thin dash-and-dot line.
- 4) Outlines of all adaptations (earthworks), which relate to formation, red colour. For plotting it corresponds to a thick line.
- 5) Outlines of proposed roadway by continuous thin line.
- 6) Cross section centreline is accompanied by terrain level (horizontally) and vertical alignment level (vertically).
- 7) Edge of pavement and carriageway marking is marked by short vertical lines accompanied by shortened level, i.e. units of meter and centimetres (e.g. 1.65). Levels of formation are marked in a similar manner. Detail points of formation can be identified by level and location in a form: 355.20/15.80 - elevation/position. Choice of all such options is based on settings of plotting code no. 8.
- 8) Datum plane is marked by thin continuous horizontal line with description of datum plane level.
- 9) Each cross section is marked by chainage of proposed road that is located at centreline above the cross section.
- 10) Earthworks and accompanying works data will not be specified in cross sections (according to Clause 33 of CSN 73 0140 it is not necessary to specify them in cross sections).
- 11) The Drawing can be complemented by horizontal dimensions of total cross section width (supporting documentation for land acquisitions).

For plotting of cross sections SOME functions may be omitted. Cross sections are displayed in three colours (white, red, green); you can select different pen for each colour. Font of description is standard.

1.2 Processed data files

Input files:

- .V53 - input data
- .SPR - input cross sections file

Output files:

- .L53 - listing
- .O53 - Plot file

2. Input data

Input data are collected by direct filling in tables and forms displayed on computer screen. Operation of the program is described in detail in ROADPAC manual chapter "Introduction".

2.1 Block of control data

Control data starts by selection of Input data from the main program menu. It displays:

Meaning of individual items:

- Date** date of input data entry
- Project title** text that is displayed in headings of reports
- Road title** ditto
- Name of Cross sections input file**

If the name is not specified, the program will use default name of the active road from the main menu. This file will be also used as an input of cross sections data.

Name of output drawing

Ditto. This file will be used as an output of required drawing.

2.2 Block of chainage specification

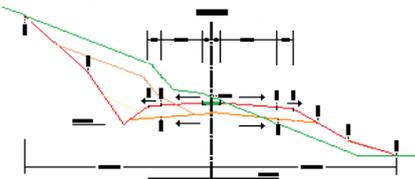
Chainage of cross sections is taken from SPR file (Corridor Cross sections). This block must be specified only if drawing of cross sections is not required for all Cross sections in file. In this case to specify any of them in next table chainage is necessary. Tables are located in DRAWING SELECTION tab. See next page.

drawings of cross sections to be plotted. If there are no plotting codes specified in some segment, cross sections in this section are not plotted (this can be used for selection from the file; nevertheless, recommended way is to specify selection by chainage block data).

Scale and options of description

Sheet arrangement | Drawing details | Crossing with units and acquisition boundaries (AB) | Drawing selection

| RP | Drawing scale 1: | Sheet height (mm) | Sheet length (mm) | Description code |
|----|------------------|-------------------|-------------------|------------------|
| ▶ | 100,000 | 297 | 1 900 | mm_2.0 |



Description options: [About scale and description options](#)

| RP | From chainage (km) | To chainage (km) | Daylights | Formation | Roadway | Terrain | Vert. align. descr. | Terrain level | Datum level | Cross section descr. | Verges gradient | Roadway gradients | Daylights gradient | Geology | Ditch levels | Dimensions | Constr. limits |
|----|--------------------|------------------|-----------|-----------|---------|---------|---------------------|---------------|-------------|----------------------|-----------------|-------------------|--------------------|---------|--------------|------------|----------------|
| ▶ | 0,000000 | 4,695650 | draw | draw | draw | draw | n_6 | draw | draw | n_7 | draw | draw | draw | draw | draw | draw | draw |

Table scale of drawing:

Meaning of individual items:

Scale is number of drawing scale. If zero is specified, the program will replace it by a default value 100. (Scale 1:100).

Sheet height specified in mm. It is limited by size of a plotter. Default = 297.5 mm.

Sheet length specified in mm. It is limited by size of a plotter. Standard = 1900 mm.

Description Code of font size Code of used font size. Values:

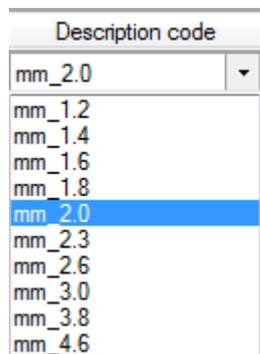


Table option of drawing by codes from 1 -15:

Chainage segment from (km) means chainage of beginning of a segment of drawing codes validity for a drawing specified in a row in km.

Chainage to (km) means chainage of end of segment in km. If zero is specified, the codes will be valid in a single cross section only.

Description options are requests describing, what should be plotted in cross sections covered by given segment:

- In general: 0 = plotting not required
- 1 = plotting of below specified cross section parts is required

- K1: Daylights.
- K2: Formation.
- K3: Roadway.
- K4: Terrain.

K5: Levels of vertical alignment and number of decimal places of levels description (mm or cm):

X number of decimal places of vertical alignment level

Y number of decimal places of edges level

| Value of code (5) | Vert. alignment dec. pl. | Carriageway dec. places | With profile grade mark |
|-------------------|--------------------------|-------------------------|-------------------------|
| n_0 | Without description | 2 | no |
| n_1 | 3 | 2 | no |
| n_2 | 2 | 2 | no |
| n_3 | 3 | 3 | no |
| n_4 | 3 | 2 | yes |
| n_5 | 2 | 2 | yes |
| n_6 | 3 | 3 | yes |

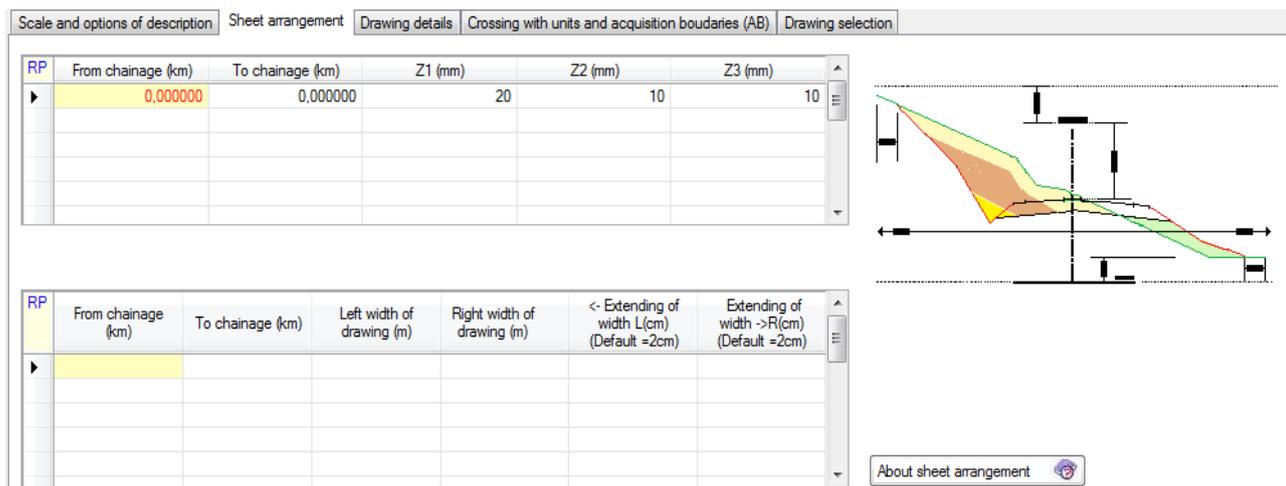
- K6: Terrain elevations.
- K7: Datum plane.
- K8: Description of elevations: Edge of a pavement and edge of a carriageway marking, edge of formation, detail points.
Permitted values of K8 code are 0 to 7 with following meaning:

| Value of code (8) | n_0 | n_1 | n_2 | n_3 | n_4 | n_5 | n_6 | n_7 |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Carriageway edges levels | no | yes | no | yes | no | yes | no | yes |
| Formation edges levels | no | no | yes | yes | no | no | yes | yes |
| Daylights edges levels | no | no | no | no | yes | yes | yes | yes |

- K9: Verge gradient
- K10: Roadway gradients
- K11: Daylights gradients.
- K12: Geology.
- K13: Ditch levels
- K14: Roadway dimensions.
- K15: Dimensions of construction limits.

2.3.2 Parameters –Height and width of section zones

Table located in SHEET ARRANGEMENT tab is designed for detailed specification of space arrangement of one cross section in drawing. If the table is empty, the program will use default values of zones Z1 to Z3. If smaller than standard values are specified, the program will replace them by default values. See next page.



2.3.3 Table layout of sheet height

Meaning of individual items:

Segment from is chainage of beginning of section of parameters validity from km

Segment to means chainage of end of validity section to km

Heights of zones specified in mm; it concerns following types:

Z1 Zone above a chainage description. Default = 20 mm.

Z2 Zone between a chainage description and a cross section drawing.

Default = 10 mm.

Z3 Enlargement of distance between a cross section drawing and description of datum plane. Default = 0.

Table layout of sheet width

This table is also located in HEIGHT AND WIDTH OF SECTION tab; it is designed to specify width of cross section drawing with following meaning of parameters:

Segment from is chainage (km) of beginning of segment of parameters validity

Segment to means chainage (km) of end of validity segment

Width left / right means width of drawing from centreline in meters. If the width is not specified (0), the program will plot the terrain in range of specified width from CORRIDOR CROSS SECTIONS file. If specified width is equal (0) then rule of 2cm will consider.

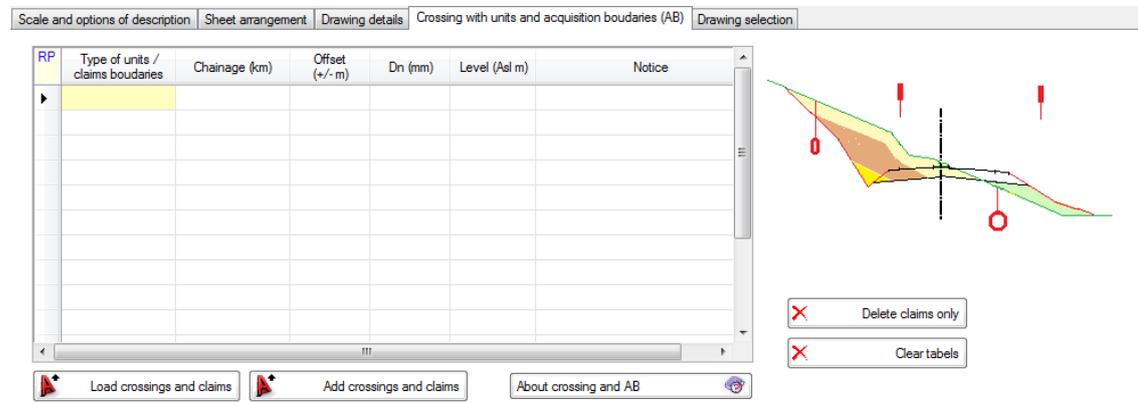
Extending of width left / right is a distance from point of construction limit to the left/right side in cm. If the columns are empty, cross sections width will be variable so that terrain will be plotted 2 cm beyond construction limit.

2.3.4 Details of drawing

In table located on DRAWING DETAILS tab user can subsequently add dimensions of cross section details, i.e. edges of a carriageway marking strips, which are not processed by program RP51 CONSTRUCTION OF CORRIDOR CROSS SECTIONS. Block of

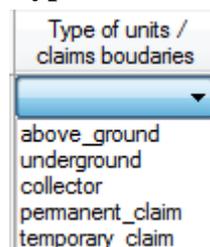
2.3.5 Crossing with units and acquisition boundaries

On next tab is placed table intended for drawing specification of crossing units or land acquisition marks respectively.



Meaning of individual items:

Type of unit/ claim boundaries, user select required option



Chainage means chainage of relevant cross section in km

Offset (+/-m) means transverse position of item in relevant cross section

Dn (mm) Diameter of unit if it is an underground unit

Level (m) Level of unit if it is an underground unit

Notice Arbitrary text

In RoadCad is a built-in function to generate crossing with units in longitudinal profile and with cross sections of the alignment (based on the plotted units networks, plotted alignment and plotted cross sections according to the .SSS file - the system of chainage. Function creates a file Align.css (data for cross sections) and align.crs file (data for longitudinal profile). On forms of RP53 and RP34 programs is placed buttons " Load crossing and claims" that reads (.css .crs) files, if any, and they are included in the input data, V53 and V34, and also in the dialog table. This makes it possible not only to draw markup of crossing, but also their eventually manual modification by the dialogue.

A similar method as crossing of units are also enters the drawing of boundaries temporary and permanent land claim in the cross section drawings. To file .Css from the layout are intersections of cross section with boundary of permanent and temporary claim generated, as it is defined by the coordinates, and these boundaries are again transferred to the input data, the RP53 . The dialog is again possible to make their

modification. In cross sections drawing are then drawn by special mark - single or double flag.

Load crossing and claims.

This will erase the existing data of the crossing and claims, and replace them with new ones from the "align." .CSS, file if the file exists.

Add crossing and claims

A similar function, but the original data file V53 retained (may be a previously written data directly into the tables).

Delete claims only

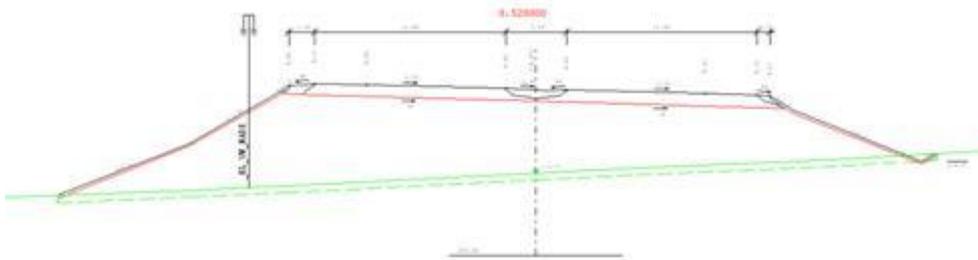
It prepares the table before loading claims. The claim data are deleted. The data crosses remain.

Clear tables

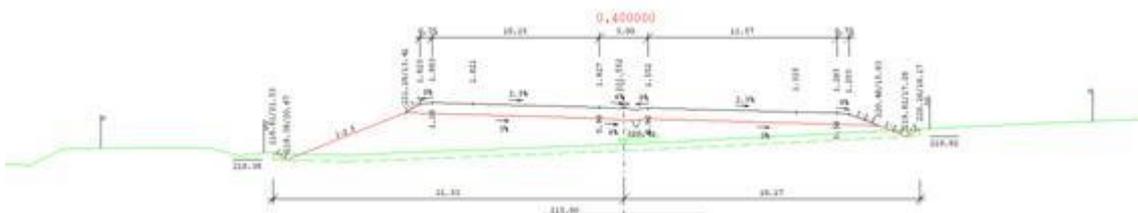
It prepares the table before loading: all data in the table is deleted

Intersections with the cross sections is bound to set of chainages .SSS (used while is generating the file .CSS). If there is a change in the chainage system (e.g. cuts to thicken), it would have to generate .CSS file again.

Sample drawings of units crossing



Sample drawings of claim boundaries



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.

4. **Plot file**

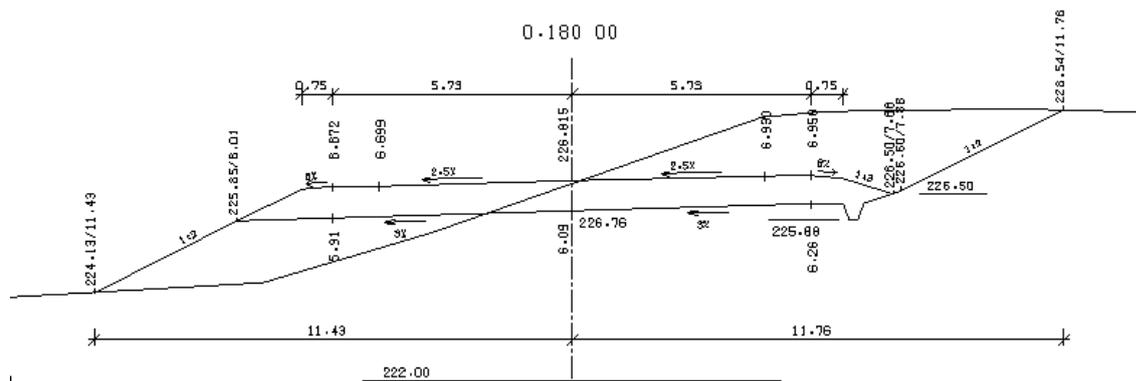
Output file PLOTFILE contains drawings of individual cross sections situated vertically so that their centrelines are on a vertical. For arrangement of their layout in a drawing you can use program ARX1 CAD system (e.g. AutoCAD/BRICSCAD). Single PLOTFILE file can include up to 512 images – cross sections. As the limit of file SPR file (cross sections) is up to 8,000 cross sections, the program creates a new (additional) PLOTFILE file always after reaching 512 cross sections. Its name is automatically derived from the name of the first PLOTFILE file "road.053" so, that the name "road" is extended by character 1, 2, ... A, B, etc.

Resulting or modified drawing can be processes (view or plot) by PRAGO PLOT system directly from ROADPAC menu or after that. Part of the system is an export to AUTOCAD/BRICSCAD format DXF. For plotting on a plotter you can use various pens that can be assigned colours on the display according to following table.

If the export to AUTOCAD is initiated directly from Roadpac menu, the program automatically assigns colours according to following table. If the export is initiated directly from PLOTF5 program, when the drawing is displayed, you can set assignment of colours individually; this assignment can be saved. PLOTF5 program uses different default values for colour assignment than Roadpac system.

| Meaning thickness of a pen | Display | A-cad according to Roadpac | A-cad according to PLOTF5 |
|---|-------------------|---|--|
| basic descriptions and roadway - thin line | white no. 15 | | 7 |
| roadbed, chainage, descriptions - thick line | light red no. 12 | | 1 |
| terrain and topsoil stripping | light green no.10 | | 3 |

Following illustration of cross section drawing of a single carriageway road contains a maximum of possible descriptions:



5. Warning messages

The program differentiates between fatal errors, which usually cause program termination with unusable results and formal errors that are handled by alternate solution. Fatal errors are marked by *** in reports and formal errors are marked by **.

The following table contains list of error messages and comments to alternate solution:

| Error message text | Alternate solution |
|--|--------------------|
| *** Leading line is missing * 53 | |
| *** Inaccessible type of leading line: *aaa | |
| ** First line ignored | |
| *** Between leading data read no marked line * | |
| *** Premature data end | |
| *** Line read with error, program will ended: (line description) | |
| ** Line read with error, ignored: (line description) | |
| ** Ending line 999 is missing | |
| *** Inacceptable line type: (line description) | |
| *** Line 531 is missing | |
| *** Line 532 is missing | |
| ** Scale was not specified, set 1:100 | |
| *** Code for text size is incorrect | |
| *** Formal error in line 53,nnnn | |
| *** More than 1 line 531 | |
| *** Entered description nnnn without drawing (ditto) | |
| *** Entered geology without complete drawing | |
| *** More than 10 lines of type 53 nnn | |
| *** Different parameters in same segment - line 53 | |
| ** Identical lines 53 (line description) | |
| ** Entered overlap nnnn = 2cm | |
| *** No drawing and description is required | |

| | |
|--|--|
| *** End of file detected, calculation not finished | |
| ** Outside drainage not specified nnn sets bottom width = 20 cm, depth 40 cm | |
| ** Inside drainage not specified nnn sets bottom width = 20 cm, depth 40 cm | |
| *** Chainage of segment beginning is greater than n.nnn chainage of segment end | |
| *** Km n.nnnnn drawing codes not specified, omitted | |
| *** At function code = nnn leading lines do not follow lines 00 | |
| *** Instead of line 53 follow lines aaa | |
| *** Any segment and any point has not been specified at n.nnnn code function = 1 | |
| *** Errors in chainage block | |
| *** more than nnn chainage points | |
| *** Chainage km n.nnnnn repeats | |
| *** More than 5 segments were specified | |
| *** Premature data end | |