

NEW AND ADVANCED FUNCTIONS OF KRAB 8.2

KŽV is constantly improving its products. We offer free of charge updates of analysing programme Krab 8.2.

Main improvements

1. GPS Function support

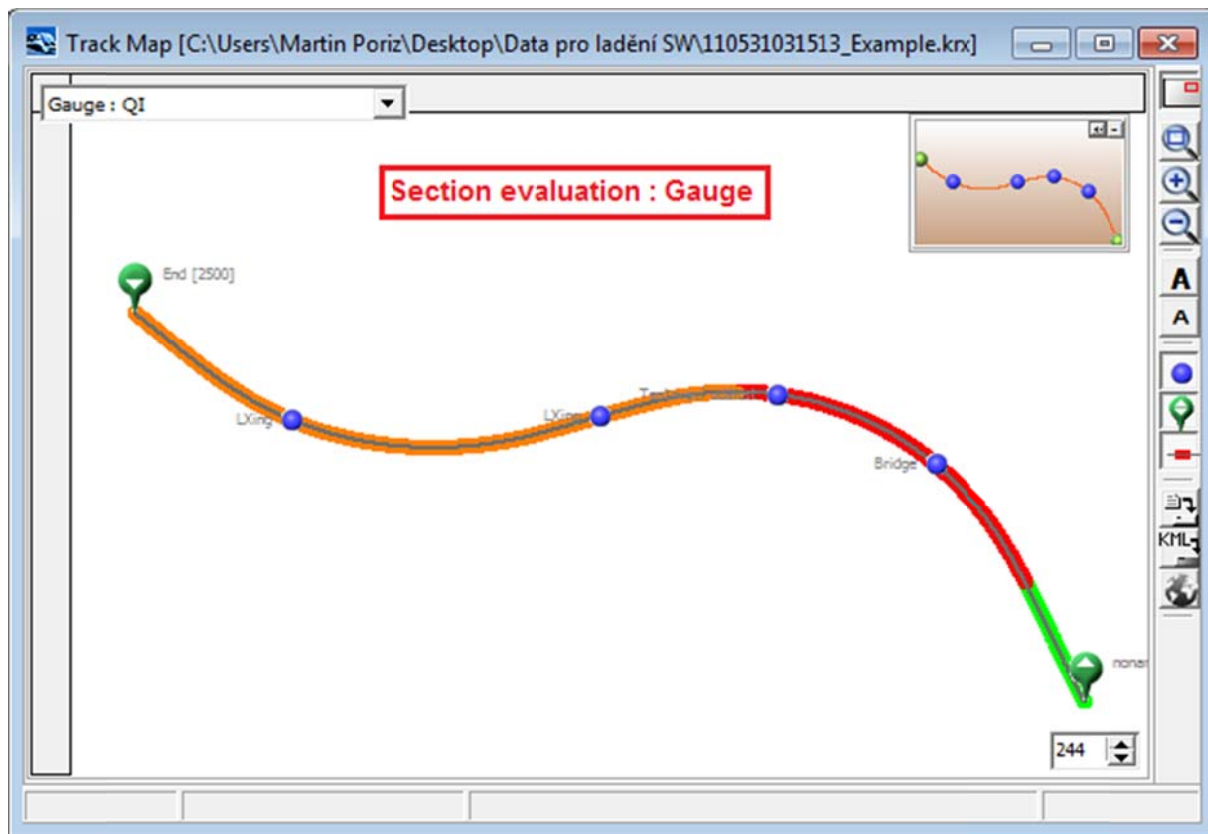
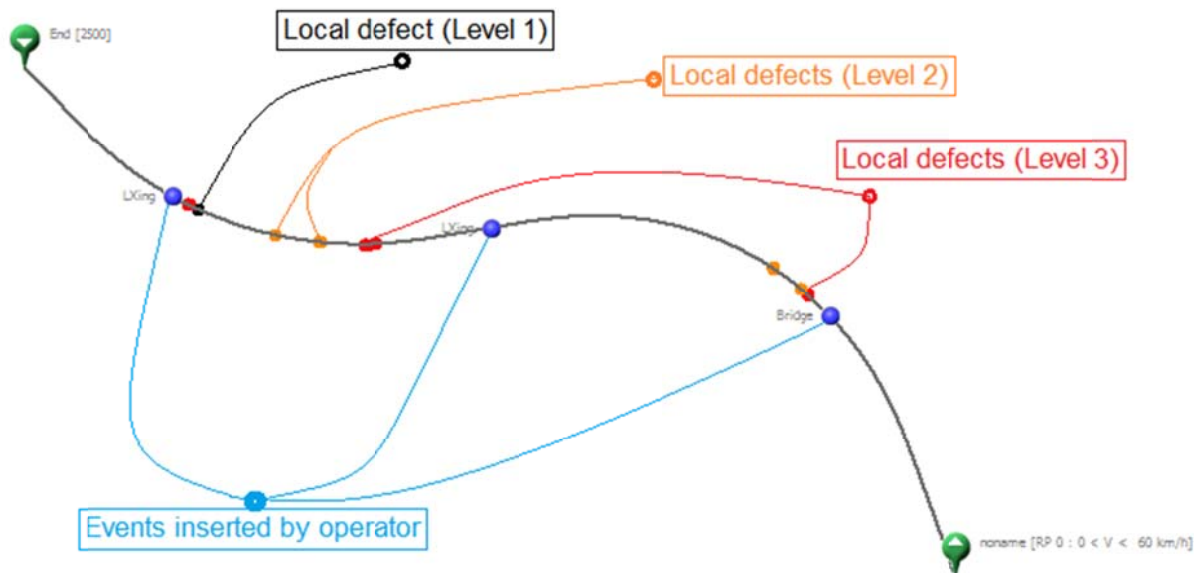
- Each local defects is recorded with the GPS coordinates
- Table of local defects or just events shows these defects and can be opened in Google Earth

km	Lateral				Vertical				Top			Events
	Alignment		Gauge		Cant	Twist			TpL	TpR	CT	
	AIL	AIR	Ga	G/m	Cant	3,00	6,00	12,00				
Lev1	16	16	30-7	6	16	12,0	21,1	33,8	17	17	50,0	
Lev2	18	18	33-8	7	18	15,0	25,0	35,6	20	20	60,0	
Lev3	21	21	35-9	8	20	18,0	29,0	38,0	24	24	70,0	
2,178												50°00.8223'N 014°13.5924'E
2,202												50°00.8114'N 014°13.5952'E
2,205				2+12,4/3								50°00.8056'N 014°13.5965'E
2,212												50°00.8056'N 014°13.5965'E
2,226				0-8,5/3								50°00.7942'N 014°13.5999'E
2,233												50°00.7942'N 014°13.5999'E
2,239												50°00.7895'N 014°13.6018'E
2,249				0-8,8/3								50°00.7841'N 014°13.6045'E
2,282250												Bridge
2,292				1+9,3/3								50°00.7646'N 014°13.6188'E
2,293	0+18,4/2											50°00.7646'N 014°13.6188'E
2,297				2+30,4/3								50°00.7606'N 014°13.6229'E



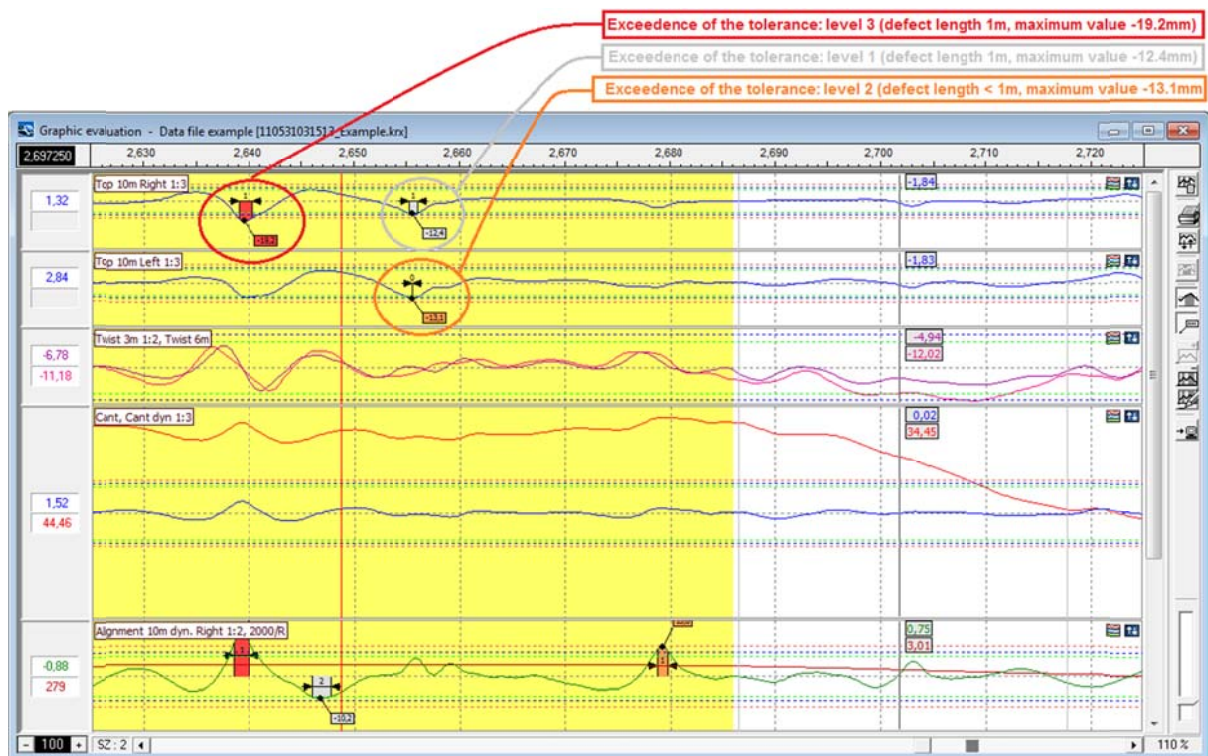
2. Track map

- Software calculates a line showing real shape of the track, calculation is based on Alignment data, not on GPS, so this function is available also without GPS receiver.
- On the track map can be displayed Events, Local defects of Section evaluation



3. Changes in Graphical output

- Graph can be highlighted – to mark some important sections.
- Graphical output could contain 3 levels of tolerances.
- Data file can be divided into the more sections and have more speed zones.



4. Enhanced events management

- Modification of the events, add or remove event, export

Events export

Sample	km	Code	Name
2	13,171750	DEF	Tonsley line EOL
203	13,121500	DEF	Platform Tonsley Station down end
313	13,094000	DEF	IRJ
691	12,999500	DEF	Platform Tonsley Station up end
1607	12,770500	DEF	Axle ctr 1330/1238
2481	12,552000	DEF	Signal 1238
2485	12,551000	DEF	Axle ctr 1238/1238A
2742	12,486750	DEF	Axle ctr 1238A/B
2749	12,485000	DEF	Signal 1237
3681	12,252000	DEF	Axle ctr 1238B/C
3737	12,238000	DEF	LX Alawoona Avenue down end
3796	12,223250	DEF	LX Alawoona Avenue up end
3849	12,210000	DEF	Axle ctr 1238C/D
3878	12,202750	DEF	Platform Clovelly Park down end
4325	12,091000	DEF	Platform Clovelly Park up end

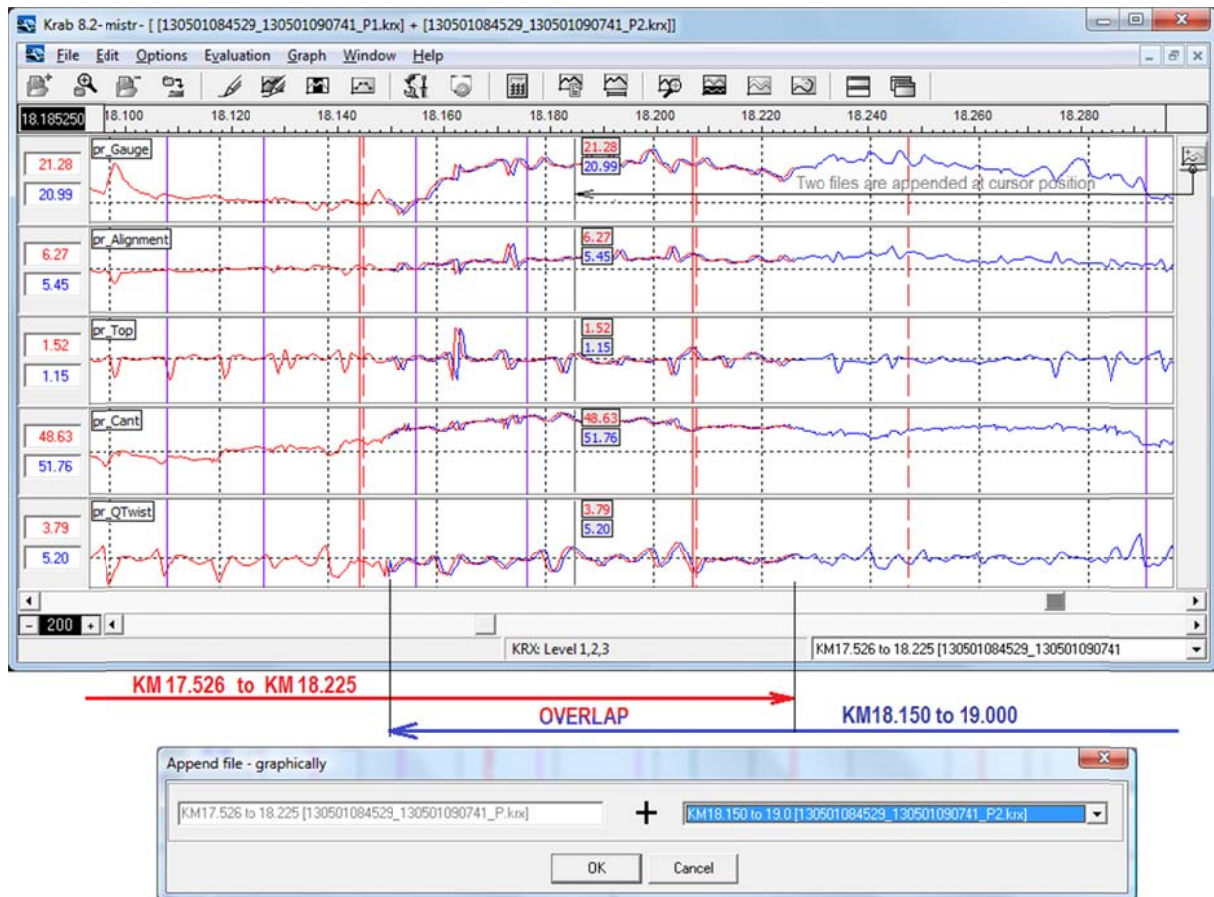
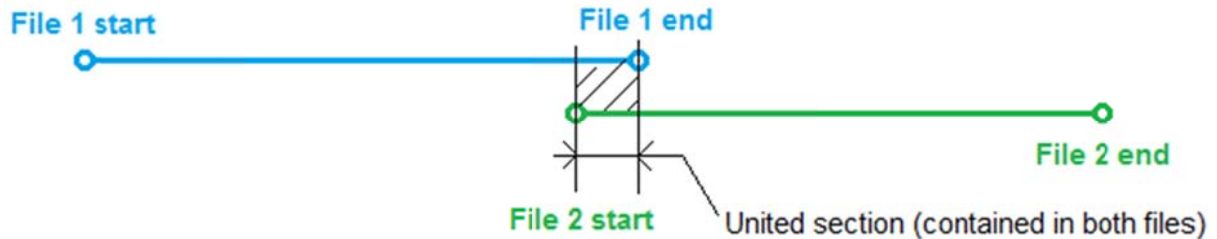
Events filtration

DEF
 ZKM
 ZKM_a
 VYH
 GPS

OK
Cancel

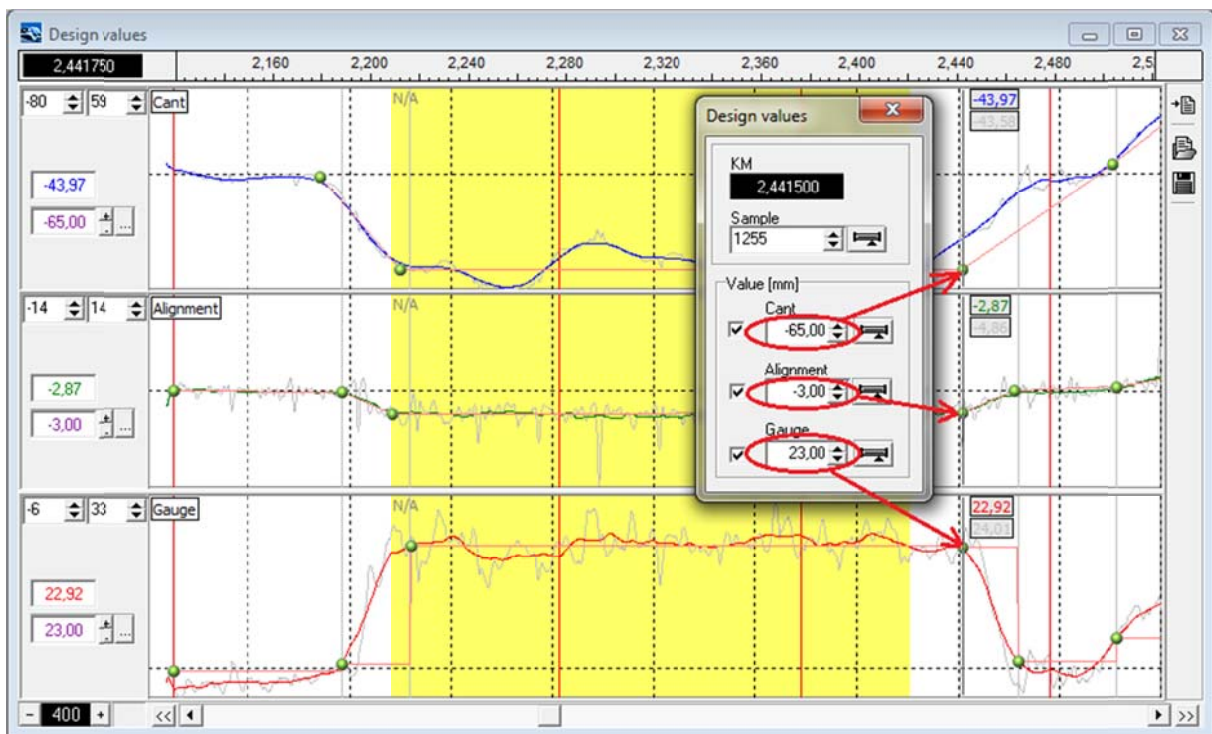
5. Graphical connection of two files

- Software supports graphical merging of two files
- Advantage of this function is precisely synchronized point of connection of the geometrical signals
- Scheme of the measured files to be merged by synchronization:



6. Work with design values has a new shape

- Design values (track project data) can be uploaded into the Krab 8.2 and compare project data with real measured data.
- Design values can be uploaded from csv file or installed manually – graphical interface.
- Design values are now available for Cant, Alignment and **Gauge**:

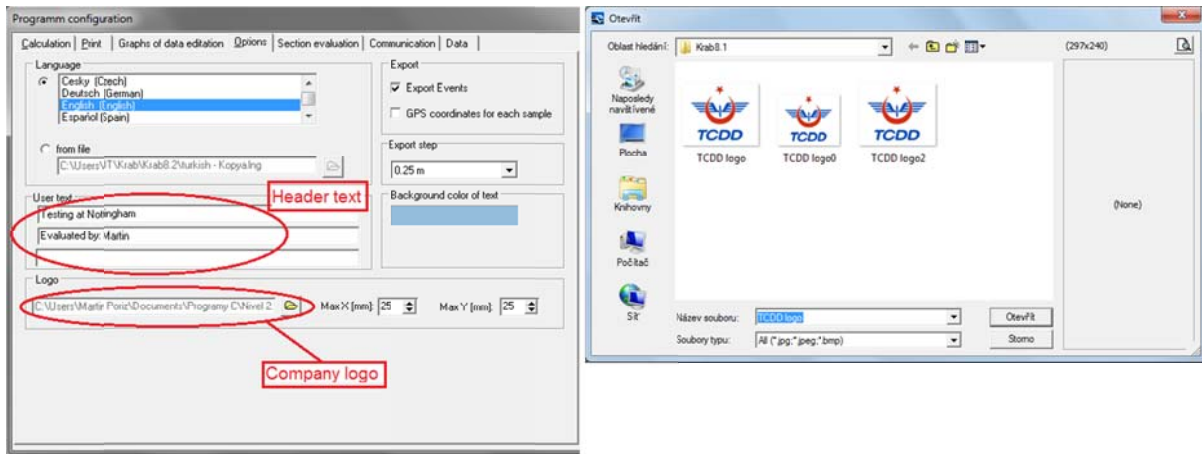


- Each design value point can be placed into the correct position by mouse (drag and drop)

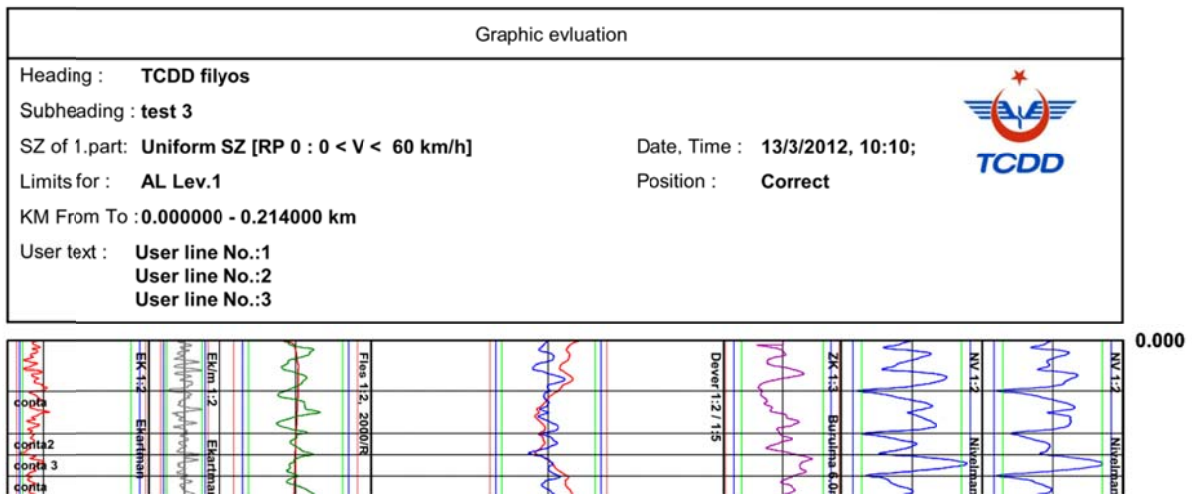
7. The customizing of header of printouts

7.2 Customer Logo and 3 user text lines

The customer can create its logo in form of picture file. The supported file types are jpg, jpeg and bmp:

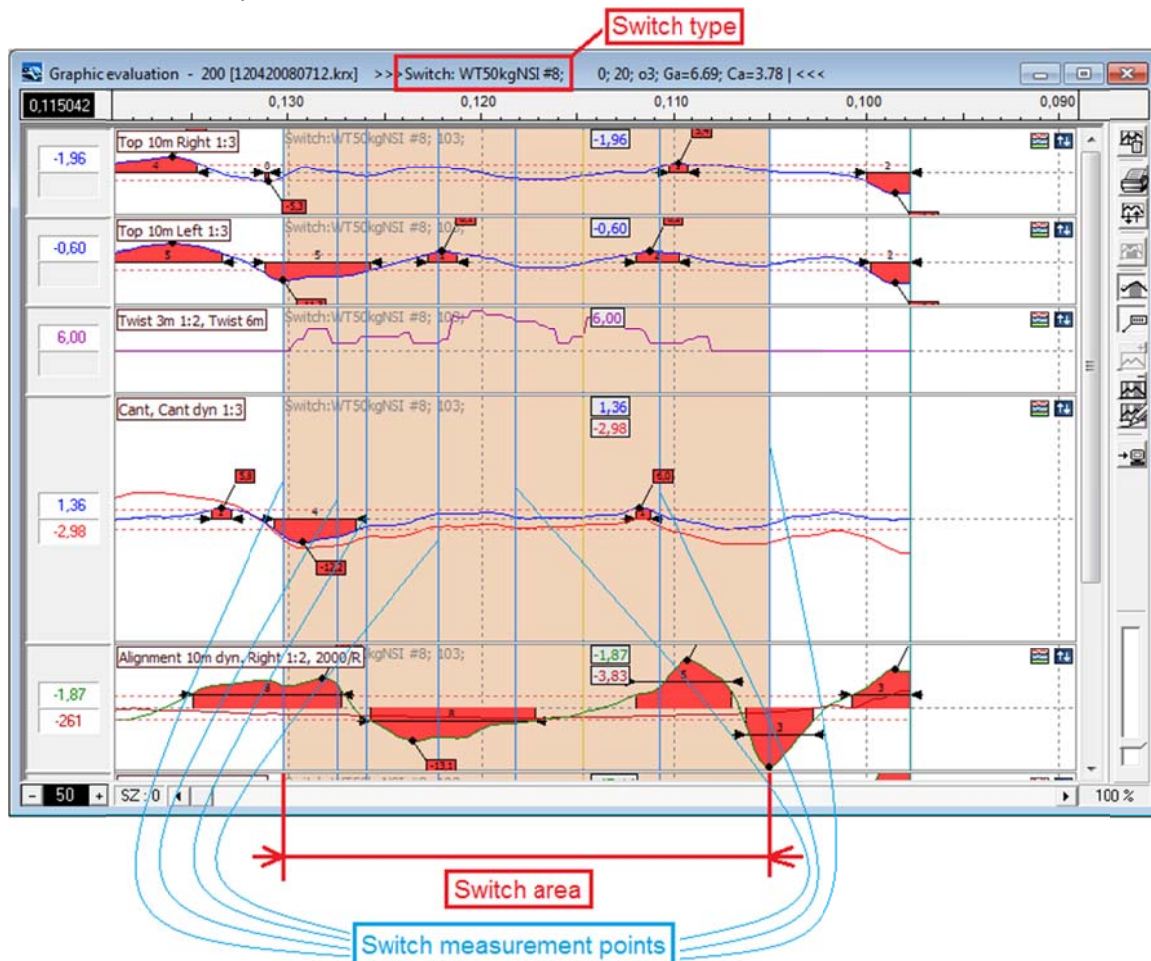


There is also available to complete any three customer lines which are shown and printout at any heading of Graph, Tables of local defects or Tables of section evaluation, see an example:



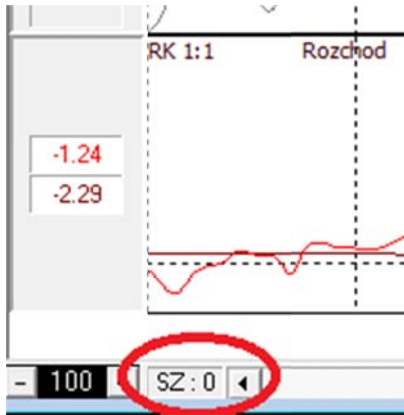
8. Switch events

- Switch area is highlighted in graphs
- The switch points are shown in details for the the KM scale >200m



- The light blue horizontal lines represent the particular switch points (p1-p7, o1-o8)
- The track gauge and cant is indicated on the switch points
- Position of the switch points and its count can be customized

9. SZ in graph



- The track graph window shows the speed zone referring the actual cursor position

10. KrabEvalFile.xml

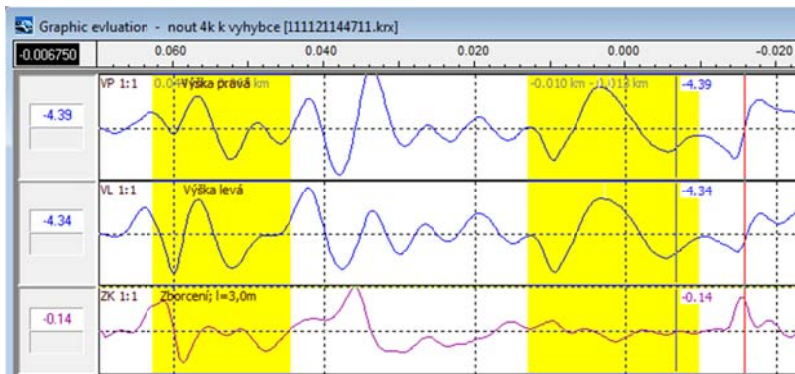
This extra .xml file is added to .krx data archive by evaluation program. It stores additional evaluation data such as break points, speed zones, highlighted sections etc.

```
<?xml version="1.0" encoding="utf-8" ?>
- <KrabEvalData>
- <Description>
    <EvalSW>Krab 8.2; build #12122012</EvalSW>
  </Description>
- <BreakPoints>
    <BreakPoint>130</BreakPoint>
    <BreakPoint>154</BreakPoint>
    <BreakPoint>261</BreakPoint>
    <BreakPoint>262</BreakPoint>
  </BreakPoints>
- <HighlightedSections>
    <Section start="5" end="31" desc="-0.001 km - -0.008 km" />
    <Section start="85" end="120" desc="-0.021 km - -0.030 km" />
  </HighlightedSections>
- <TSZSections>
    <TSZSection name="Jednotné RP" end="305" SZ="0" />
  </TSZSections>
- <DesignValues>
    <Alignment />
    <Gauge />
    <Cant />
  </DesignValues>
```

</KrabEvalData>

11. Highlighted sections

- You can highlight multiple sections with a marker. The colour of the marker can be adjusted.

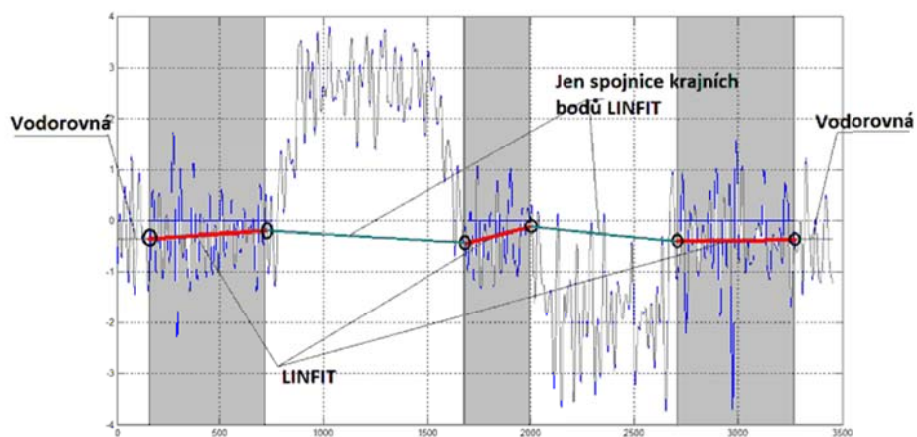
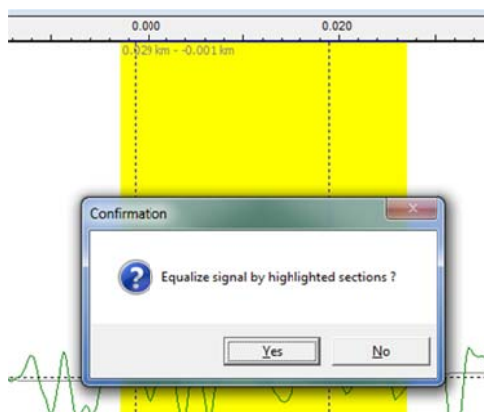


There are a couple of shortcuts that make various actions:

- Ctrl-T The basic statistics of GPK at highlighted subsections
 - Ctrl-F11 The line interpolation
 - Alt-F11 The generalized offset of the signal by folded line, calculated as a lines interpolation on the highlighted sections
 - Ctrl Alt-F11 The generalized offset of the signal by folded line, calculated as averages horizontal lines on the highlighted sections
- Using Ctrl-T you can produce a summary .csv file. Each line corresponds to one marker. The numbers represent the maximum amplitude of the geometrical value within one marker.

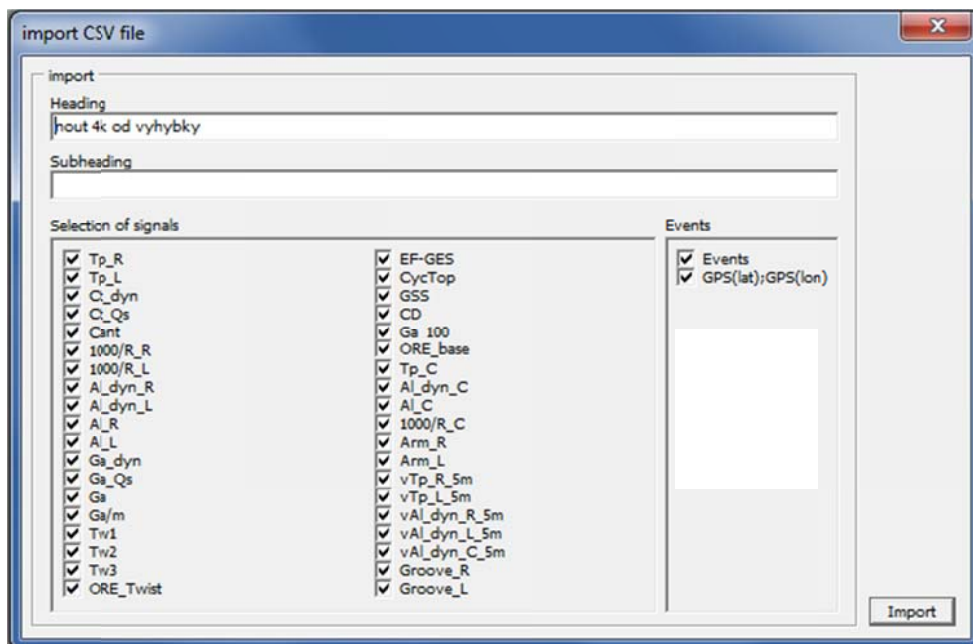
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Heading : nout 4k k vyhybce													
2	Subheading :													
3	Data file : 111121144711													
4	Date, Time : 21/11/2011, 14:47,													
5	Position : Correct													
6	*****													
7														
8	KM_From	KM_To	Tp	Al_dyn	1000/R_av	CtMax	CtMin	Ct_dyn	GaMax	GaMin	Tw1	Tw2	Tw3	
9	0.06275	0.04425	-9.08	2.23	-0.14	3	-12.23	-7.65	3.1	-1.38	-7.04	12.57	-11.35	
10	0.013	-0.00975	9.17	-4.16	-0.12	1.84	-3.27	-2.05	1.62	-1.41	-2.31	4.56	6.61	

- Using Alt-F11 pr_Alignment signal might be normalized



12.CSV track geometry data import

- You can import .csv geometry data from any source in .csv format using File-Import function.



13.Cant deficiency

This is a crucial parameter for any attempt to increase the track operational speed.

The amount by which the actual speed exceeds the balance speed is conveniently expressed via the so-called cant deficiency, i.e., by the amount by which the superelevation (cant) would need to be increased to raise the balance speed to the speed at which the vehicles actually travel.

Cant deficiency cd , is given by the formula

$$cd [mm] = \frac{v^2 \cdot s}{R \cdot g} - Cant_{act}$$

Where:

s is nominal track gauge plus the width of the rail head in [mm] (1435[mm] for international gauge)

v track operational speed in [m/s]. For example speed 72km/h, $v=20$ m/s

R the curve radius in [m]. Usually track curvature given by Krab signal 1000/R is considered.

g gravity constant 9.81[m/s²]

$Cant_{act}$ is an actual curve superelevation in [mm]. Usually $Cant_{Qs}$ is considered.

Example for R=400m:

$$cd = 20^2 \cdot 1500/400/9.81 - 100 = 53[mm]$$

Krab supplies cant deficiency automatically as one output signal.

There are limits for the cant deficiency:

Max cant deficiency: 100mm

Max cant excess: 80-110mm

14. New signals of sliding STD

1. Floating average of standard deviation of left and right Top: Tp_L, Tp_R
2. Floating average of standard deviation of left and right Alignment Al_dyn_R, Al_dyn_L
3. Floating standard deviation of Ca_dyn
4. Floating standard deviation of Ga_dyn
5. Weighted mean of 4 STD signals
s STD, w weights from Krab.zk table: CK_ALIGNMENT=1.0,
CK_GAUGE=1.0,CK_CANT=1.0, CK_TOP=1.0:

$$\sqrt{w_1 \cdot s_1^2 + w_2 \cdot s_2^2 + w_3 \cdot s_3^2 + w_4 \cdot s_4^2}$$