SWITCH POINT INSPECTION BY KRAB 84.09

KRAB 84.09 can be used for switch point inspection as an option. The extra auxiliary rollers for flange groove width measuring have to be mounted on the basic trolley. Measuring program is provided by special part of switch point measuring. Extra analysis software SWITCH™ is available for off-line data manipulation, analysis and the Inspection Report print out. The switch point is understood as an integral part of the track. So, the regular scanning of the track geometry values runs at background and important discrete location of the switch points are measured in detail when trolley stops.

Auxiliary rollers:

The trolley has to be provided by two special shoulders with isolated rollers. These shoulders can be mounted to existing trolley as an additional part. The rollers can be lift up to transport position and activated to measuring position very easily.

The rollers measure:

- groove of the guard rail
- groove of the wing rail and frog
- backgauge

The basic technical data:

Mass of shoulders: +6 kg
Accuracy: better than 1 mm for all switch values

Measuring software:

Extra part of measuring program KrabDroid supports the data collecting at discrete switch location in the form of special events. Each such event contains the name of the station, switch number, measured values and values coming from visual inspection.

Analysis software SWITCH™

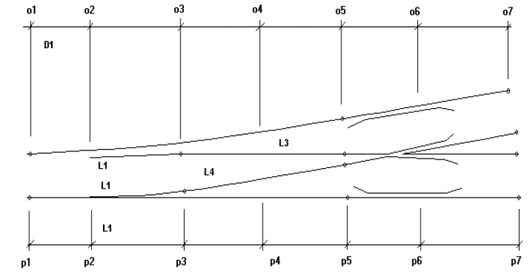
This advanced software tool automatically couples the main and turnout branches of the switches, parses the events and builds Switch Inspection Report.

TURNOUT INSPECTION

Station : **Noutonice** Date : 4.12.2014
Turn. No. : **5A** User To Enter :
Turnout type : 37kg #8 Limit values sheet :
Description : Noutonice :

Diverted line The narrowest groove : 0.00 mm

	1	2	3	4	5	6	7
Gauge	1425.4	1437.1	1438.9	1436.6	1435.1	1424.0	1440.3
Cant (Cross Level)	-15.4	-17.8	-2.5	4.2	4.9	-0.3	3.7
Top R	-19.1		-22.4	18.0	1.2		-1.2
Top L	-19.1		-24.5	21.0	1.2		4.6
Alignment R	12.0		5.6	-3.2	5.2		30.5
Alignment L	0.6		1.7	-2.7	-0.3		24.4
Frog groove							113.4
Check rail groove							98.6
Tongue gap	98.6	98.6					
Check rail gauge							1341.7
Channel width							1228.3
Point distance	0	1423	11418	16084	21104	23491	24830
Twist [2m]	-0.9	-1.3	0.5	3.8	0.1	-2.3	1.0



The scheme of the points to be measured at the single switch

Main line The narrowest groove : 0.00 mm

	1	2	3	4	5	6	7
Gauge	1425.4	1436.8	1430.2	1433.5	1436.1	1426.2	1424.5
Cant (Cross Level)	-15.4	-18.5	3.5	11.0	12.1	24.1	21.2
Top R	-19.1	-12.4		16.4		10.8	
Top L	-19.1	-12.3		19.5		18.0	
Alignment R	12.0	-13.9		-22.1		2.2	
Alignment L	0.6	-3.9		-19.7		-5.1	
Frog groove						48.9	
Check rail groove						37.4	
Tongue gap	98.6	98.7	98.6				
Check rail gauge						1388.8	
Channel width						1339.9	
Point distance	0	1137	11342	16136	20938	23442	25187
Twist [2m]	-0.9	-2.5	6.1	0.3	3.8	3.3	-2.7

KZV s.r.o.
Commercial railway research

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Track Recording Trolley for track geometry

KRAB 84.09

Approved by CD, RENFE, DB

The KRAB system has been designed to complete the larger and more sophisticated measuring cars. It is perfectly suitable for secondary routes, sidings, switch points and for new track acceptances.

KZV s.r.o.
Commercial railway research

TROLLEY DESIGN

The trolley has a triangular bogie which is made from steel or duralumin profiles. The trolley is provided by telescopic measuring axle. The electrically insulated wheels have separated wheels and flanges in order to remove different circumferential velocity.

The wheel surface treatment is executed in hard chrome. The trolley surface finish is yellow powder paint.

The trolley is available in wide range of nominal gauges (1000 mm ÷ 1676 mm).

MEASURING PRINCIPLE

During the measuring run the following track parametres are scanned:

- **alignment** (horizontal versines) of right rail
- **top** (vertical versines) of right rail
- **gauge**
- **cant**
- **twist**
- **distance**
- **speed**

The following derived geometric signals are computed in real time:

- **twist for selectable length of chord**
- **radius R**
- **gauge variation over 1 or 2 m**

TRANSDUCERS TO BE USED

The trolley uses contact potentiometric sensors combined with an electronic inclinometer. A rotary encoder is used for track length measuring.

Special attention is given to the selection of asymmetrical chord length.

ON BOARD COMPUTER

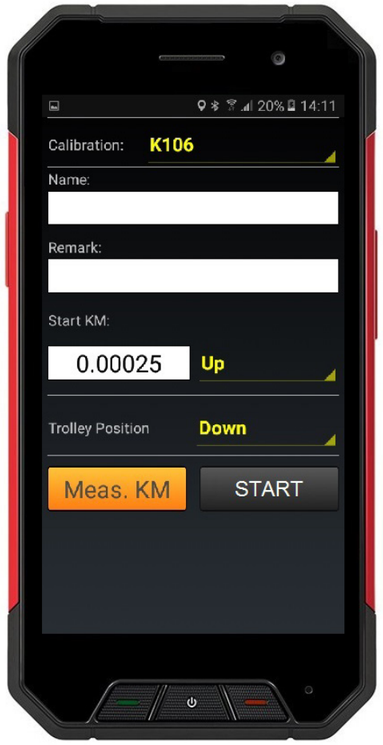
The real time processing of signals from the sensors is performed by rugged measuring computer (Android operating system) with KrabDroid measuring software, whereby the following items are determined:

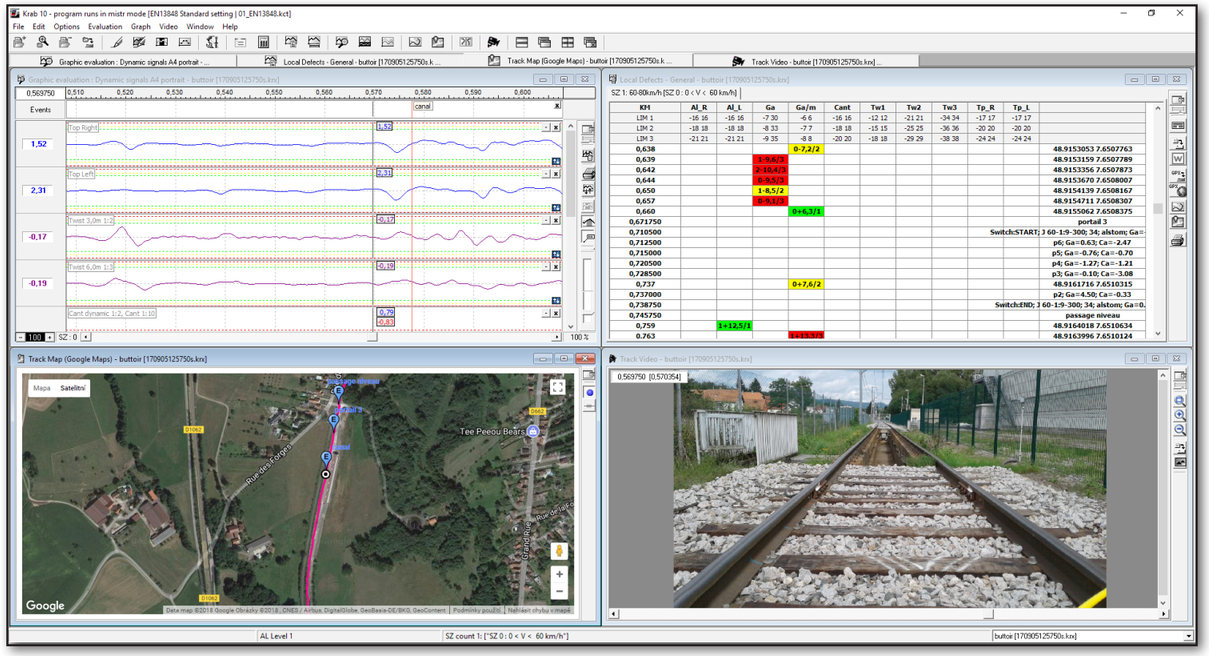
- reading and scanning of signals given above
- on-line processing of the signals:
  - anti-aliasing
  - smoothing of long wave part
  - optical and acoustical signalling when the geometry data exceed the selectable thresholds
- display of numerical values of the geometry data
- entry of the geometry data into non-erasable storage of on-board computer at the distance 0,25 m (the measuring distance depends on memory, e.g. 1000 km)
- entry of the information describing the track section to be measured
- entry selected events (e.g. mud spots in ballast, damaged sleepers etc.) with the exact position along the route

RESOLUTION OF GEOMETRICAL VALUES:

Geometric quantity to be measured	Resolution	Reproducibility (95%) [mm] *)	Range [mm]
Vertical alignment-Top (waveband 1÷25 m)	0,01 mm	± 0,5	± 50
Horizontal alignment (waveband 1÷25 m)	0,01 mm	± 0,8	± 50
Gauge	0,01 mm	± 0,4	-20+50
Cant (cross level)	0,1 mm	± 1,0	± 200 **)
Track distance	1,0 mm	1 m/km	No limits

*) EN13848-2, 4, **) For gauge 1435 mm





The example of evaluation in Krab 10

EVALUATION OF THE COLLECTED DATA BY KRAB 10 SOFTWARE

After the measuring, the collected raw geometry data are transferred from the measuring computer into any PC computer. Sophisticated assessment software computes so called actual geometry (with unit transfer function) in the waveband λ=1÷25 m via FFT (Fast Fourier Transformation) technique. Thus the following items are available:

- actual alignment and level in waveband λ = 1÷25 m
- separation of all geometric signals into long wave (λ >25 m) and short wave (λ < 25 m) parts
- so called section evaluation - statistic evaluation of the track geometry based on standard deviation and quality index
- table of local defects, print out of geometrical lay and tables

TOWING OF THE KRAB TROLLEY BEHIND ROAD/RAIL CAR:

It is very popular using the track recording trolley KRAB 84.09 as "pocked" measuring vehicle. The maximum measuring speed is 15 km/h and the capacity is more than 100 km of the track per shift.

THE BASIC TECHNICAL DATA:

Mass: 68 kg basic form
+ 4 kg auxiliary twist arm
20 hours without battery charge
Working temperature: -20÷55 °C
Water resistant

KRAB 84.09