Mobile, Non-contact Measuring System for Detection of the Contact Wire Position

Online contact wire measuring system for monitoring the contact wire position during travel

- non-contact detection of the height and stagger of the contact wire
- detection of up to 4 wires simultaneously
- can also be used for twin-wire systems
- data inputs for compensation of the vehicle movements
- battery operated
- mobile system with an installation time of < 1 hour (optional: fixed installation)
- accuracy of ± 2mm
- measuring speeds of up to 160 km/h
- extensive software package with post processing

You will find the addresses of our numerous foreign representatives in the Internet.

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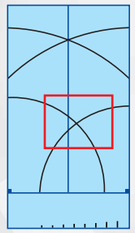
Mobile, non-contact measuring system for detection of the contact wire position

Requirements of online contact wire position measurement

Observance of the exact contact wire position is extremely important for the safe operation of electrified rail stretches, both on railways and tramways. This applies especially for modern high speed lines.
The gradient between two masts is a criterion which has to be monitored constantly in addition to the contact wire height and stagger.

The OVHWizard system

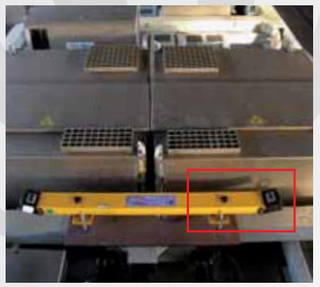
Two specially developed high-performance ultrasonic distance sensors form the core of the OHVWizard contact wire position measuring system.
These sensors are installed respectively at an optimum angle at the ends of the measuring instrument.
The entire processing electronics are located in the connecting tube between the sensors.
The system is battery operated and can therefore be used on every vehicle.



Measuring principle and system concept

The OVHWizard measures the distance by means of ultrasound and the pulse echo method, i.e. a sonar pulse transmitted by the sensor is reflected by the contact wire and back to the sensor. The time which elapses (runtime) is proportional to the distance. The exact contact wire position is given by the point of intersection of the two distance measurements.
The measured data are picked up in synchronisation with the line kilometering, triggered by pulses from a distance sensor.

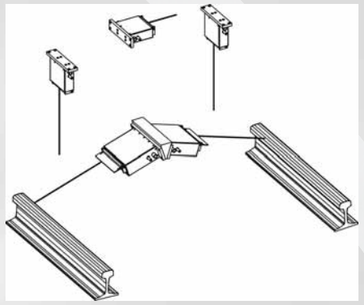
Areas of application of the OVHWizard



The small size of the OVHWizard allows a wide range of application in contact wire position detection.
The OVHWizard can be used on:

- road-rail vehicles
- contact wire laying vehicles
- measuring trolleys
- measuring trains
- rail laying machines

Vehicle compensation

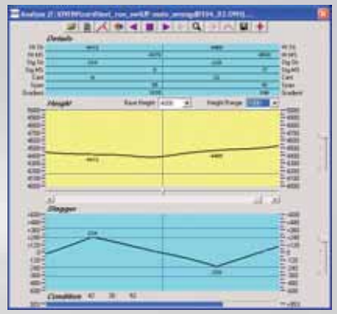


By mounting the OVHWizard, the measurement of the contact wire position in relation to the top edge and centre of the rail is influenced directly by the movement of the measuring vehicle. The measurement can be made without compensating these errors when moving very slowly (up to approx. 10 km/h) or when the demands on the measuring accuracy are low.
For high-precision measurements when the vehicle is moving the OVHWizard offers compensation inputs for the vertical (suspension) and horizontal (track clearance) movement of the vehicle as well as for the rolling angle around a known centre of rotation.
Compensation takes place directly in the measuring system.

Data output

If the vehicles on which the OVHWizard is to be used already have vehicle compensation, all the measured data of the contact wire position with distance and time reference can be transferred to this system via TCP/IP.

PC software



The software which runs on all Windows systems enables both measured data entry and online display and a comprehensive post-processing after completion of the measurement in addition to creation of the measuring profiles for the vehicle set-up.

The following standard evaluations are possible:

- tolerance monitoring for side and height
- display of overlaps
- height of the contact wire
- height of the support cable
- stagger of the contact wire
- stagger of the support cable
- determination of the mast distance
- determination of the gradient
- detection of line events (signals, crossings, points etc.)
- compensation of the vehicle position
- table printout
- video surveillance of the wire (optional)

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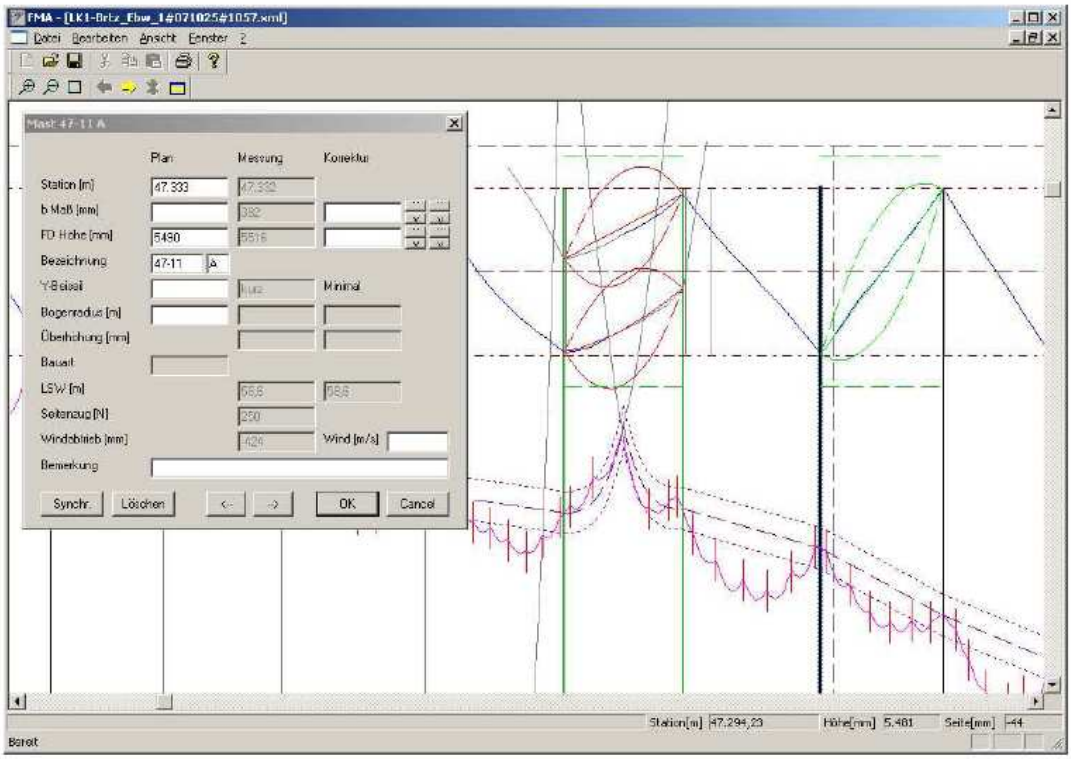
Contact Line Position Measurement



- Presentation of measurement data
- Automatic detection of poles and droppers
- Analysis of measurement and checks against construction tolerances (Re100, Re200, Re250, Re330)
  - Height
  - Radial force
  - Wind deflection
  - Gradients
- Own definition of tolerances
- Handling of large measurements, 100 km and more

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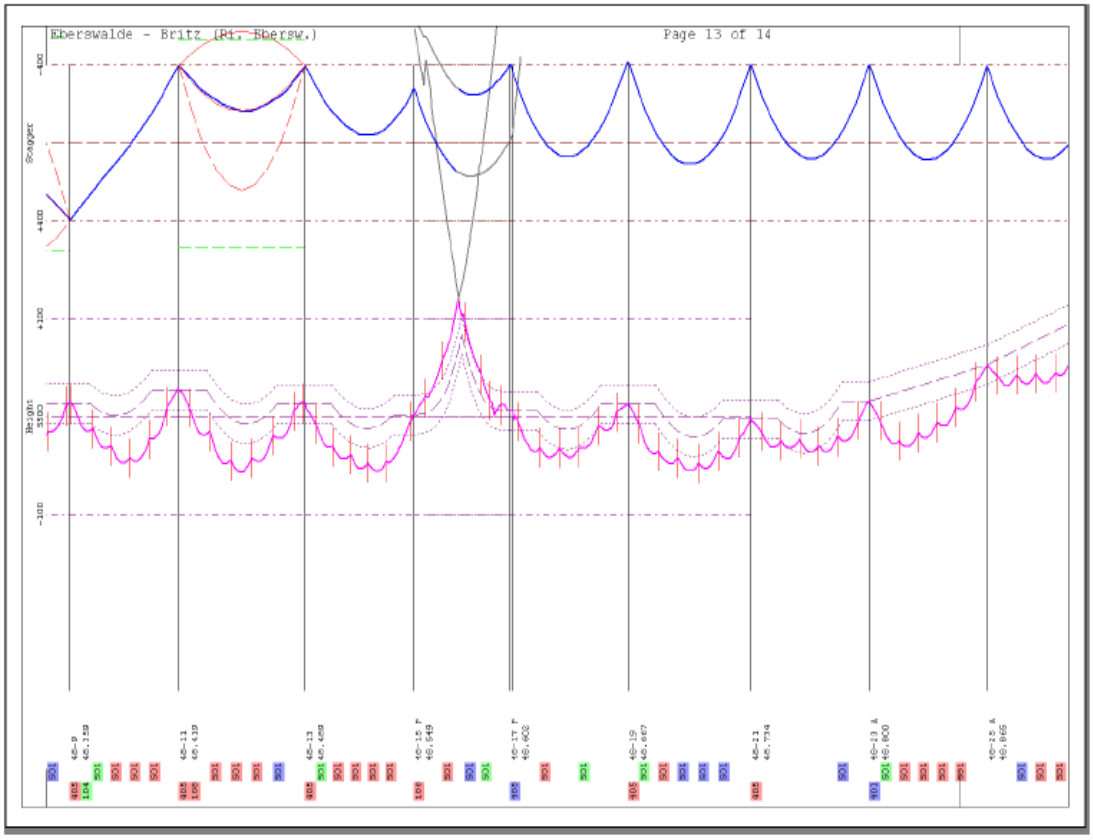
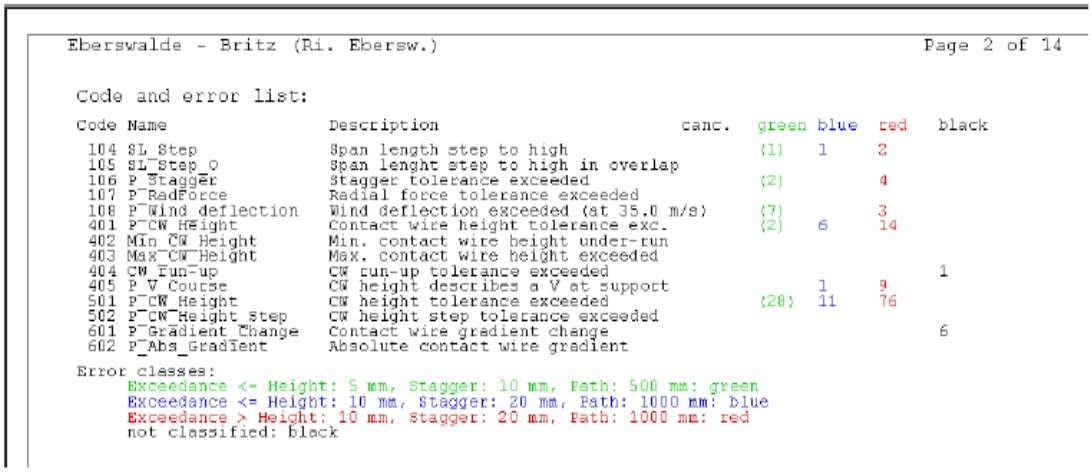
- Generation of reports with measurement data, tolerances and checks:



- Summary of checks



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Code and error list:

Code	Name	Description	canc.	green	blue	red	black
104	SL_Step	Span length step to high		(1)	1	2	
105	SL_Step_O	Span lenght step to high in overlap					
106	P_Stagger	Stagger tolerance exceeded		(2)		4	
107	P_RadForce	Radial force tolerance exceeded					
108	P_Wind_deflection	Wind deflection exceeded (at 35.0 m/s)		(7)		3	
401	P_CW_Height	Contact wire height tolerance exc.		(2)	6	14	
402	Min_CW_Height	Min. contact wire height under-run					
403	Max_CW_Height	Max. contact wire height exceeded					
404	CW_Run-up	CW run-up tolerance exceeded					1
405	P_V_Course	CW height describes a V at support			1	9	
501	P_CW_Height	CW height tolerance exceeded		(28)	11	76	
502	P_CW_Height_Step	CW height step tolerance exceeded					
601	P_Gradient_Change	Contact wire gradient change					6
602	P_Abs_Gradient	Absolute contact wire gradient					

Error classes:
Exceedance <= Height: 5 mm, Stagger: 10 mm, Path: 500 mm: green
Exceedance <= Height: 10 mm, Stagger: 20 mm, Path: 1000 mm: blue
Exceedance > Height: 10 mm, Stagger: 20 mm, Path: 1000 mm: red
not classified: black

Hata kodu	Adı	Açıklama
102	Maximum direk açıklığı	2 direk arası maximum mesafe 60 m olabilir.
103	Minimum direk açıklığı	2 direk arası minimum mesafe 40 m olabilir.
104	Direk açıklığı yükseltisi	Direk açıklık değeri üst sınıra yaklaşıyor. Tolerans 10 m ……15 m olabilir.
105	Direk açıklığı yükseltisi üzerinde	Direk açıklık değeri üst sınırın üzerinde. Tolerans 10 m ……15 m olabilir.
106	Dezeksman tolerans değeri üzerinde	Dezeksman değeri 30 mm olarak önerilebilir. 40 mm'ye kadar toleransı vardır. 40mm-50mm arası yeşil,50mm-60mm arası mavi 60mm üstü kırmızıdır.
107	Radyal kuvvet tolerans değeri üzerinde	Rapel üzerine gelecek yük değeri 80N-2800N arasında olmalıdır.
108	Rüzgar sapma tolerans değeri aşıldı(26 m/s)	Rüzgar yüküyle oluşabilecek konsol sapmasının kontrolünün yapılması.
401	Seyir teli yüksekliği tolerans dışı	Direkte tolerans değeri 50 mm dir.50mm-55mm arası yeşil,55mm-60mm arası mavi,60mm üstü kırmızıdır.
402	Minimum seyir teli yüksekliği çalışma kapsamında	Minimum çalışma aralığı 5000 mm olarak önerilir.
403	Maximum seyir teli yüksekliği üzerinde	Maximum çalışma aralığı 6500 mm olarak önerilir.
404	Seyir teli üst çalışma tolerans değeri aşıldı	Ekipman bölgede çalışma aralığı 50 mm olarak önerilir.
405	Rapelde seyir teli tanımlama süreci	max:12 mm olarak önerillir.
501	Seyir teli yüksekliği tolerans değeri aşıldı	Pandül noktalarındaki seyir teli yüksekliği. Tolerans değeri 12 mm olarak önerilir.
502	Seyir teli yüksekliği tolerans dışı(Pandüller arası)	Pandülden pandüle olan seyir teli yüksekliği.Tolerans deeri 12 mm olarak önerilir.
601	Seyir teli yüksekliği tolerans dışı(3 direk açıklığında)	3 direk arasındaki seyir teli yüksekliği farkları.Tolerans değeri 24 mm olarak önerilir.
602	Seyir teli yüksekliği tolerans dışı(Direkten direğe)	Direkten direğe seyir teli yüksekliği farkı.Tolerans değeri 24 mm olarak önerilir.

IS: Ölçülen değer

REQU: Olması gereken değer

DIFF: Aradaki fark

TOL: Olabilecek tolerans değeri

03-03(Direk No) 3.062(Metresi) +249(Ölçülen dezeksman) 52,6(2 direk arası mesafe) 5308(Seyir teli yüksekliği)

106: (IS: 249 REQU: 200 DIFF: 49 TOL: 40 [mm])
601: (IS: 26 TOL: +/-24 [mm])
502: (DIFF: -13 TOL: 12 [mm])
501: (IS: 5336 REQU: 5312 DIFF: -23 TOL: 12 [mm])
502: (DIFF: -14 TOL: 12 [mm])
501: (IS: 5333 REQU: 5314 DIFF: -18 TOL: 12 [mm])
502: (DIFF: 14 TOL: 12 [mm])

106 dezeksman hatasında:
Ölçülen:249mm,Olması gereken +200mm,Fark:49mm Toleransımız:40mm … 40mm-50mm yeşil,50mm-60mm mavi,60mm üstü kırmızı

601 3 direk açıklığı seyir teli yüksekliği farkı hatasında(Bir önceki ve bir sonraki direk ile yükseklik farkı 24 mm den büyük olduğunda çıkan hata kodu)

Ölçülen fark: 26mm Toleransımız:24mm

502 hatası pandülden pandüle olan yükseklik farkı hatasıdır. 12mm toleransı vardır.
501 hatası 2 direk arasındaki pandül noktalarındaki yükseklik farkı hatasıdır. Toleransı 12mm dir.

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501: (IS: 5336 REQU: 5312 DIFF: -23 TOL: 12 [mm])

Seyir teli yüksekliği tolerans dışı(Kırmızı yazılı açıklamalar hata koduna göre değerlendirilecektir.)

Örneğin bu direkteki 501 hata kodu 2 direk arasındaki pandül noktasındaki yükseklik farkı 12 mm den fazla olduğu için 501 nolu hatayı vermiştir.

03-07 3.170 -53 46,3 5308
501: (IS: 5339 REQU: 5313 DIFF: -25 TOL: 12 [mm])
Seyir teli yüksekliği tolerans dışı.