



**NON-DESTRUCTIVE
TESTING
EQUIPMENT**



RADIOAVIONICA
CORPORATION



RAILROAD AUTOMATION
AND TELEMCHANICS
SYSTEMS



POWER SUPPLY DEVICES FOR
RAILROAD AUTOMATION AND
TELEMCHANICS SYSTEMS



NON-DESTRUCTIVE
TESTING
EQUIPMENT

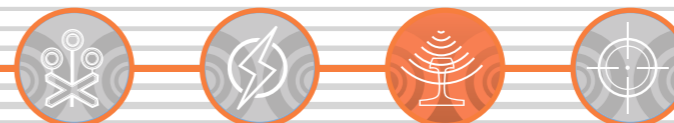


C4ISR COMPLEX
«STRELETS»



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RAIL DEFECTOSCOPY IN THE SERVICE OF SAFETY TRAIN MOVEMENT



Introduction
of General Manager
Scientific-Research
Department of NDT, PhD,
Maxim N. Shilov

Dear Customers!

During 25-years we could, not only launch a lot of innovation products, but and create complex of equipment, covering full range of the technological operations flaw detecting on railway of different countries. There are mobile and removable devices for complete inspection, special flaw detectors for the confirmed testing and track switches inspection, devices for the welding plants and others.

In spite of the fact that nowadays the main method is ultrasonic we continue to improve devices for the mobile magnetodynamic inspection with possibility to work at extremely low temperatures. Our specialists try to improve it's resolution and informativeness. Over the last years our specialists have made a great work for development a new inspection method – video registration of the rail surface and others elements of the track facilities. It's allowed not only increase accuracy of the defectograms analysis due to additional visual information but substantial extend the assortment of the detecting rail defects.

Together with our strategic partners we are ready to offer you the modern solutions for the measurement configuration parameters of the rail and total profile rail.

Along with combined flaw detector car is first introduced mobile diagnostic complex in this collection. These mobile devices guarantee total inspection with using pointed above methods and promote safety movement of the trains on railways Russia, Kazakhstan, Hungary and others countries.

In spite of the fact that a lot of railways are making gradual transition on high performance inspection by using mobile devices, removable flaw detectors are still demanded. "Radioavionica" JSC regular shows to its customers new generations of the flaw detectors which meet the actual requirements.

All flaw detectors of "Radioavionica" JSC use ultrasonic inspection methods based not only on classic ultrasonic inspection modes which are widely popular all over the world. There are appeared the new ultrasonic inspection modes allow greatly improve inspection effectiveness of separate rail section zones, evaluate real dimensions of defects and extend list of detected defect due to researches of our specialists. All unique inspection methods of own design are patented.

If the first flaw detector AVICON-01 had just friendly interface and possibility to display

signals due to microprocessor processing, that our novelty of 2016 year, flaw detector AVICON-31, helps operator to check the rightness parameters of flaw detector settings and also to make analysis of getting signals.

Taking into account specifics and traditions of NDT systems in different countries we offer as traditional sliding searching unit so as widely spread ultrasonic wheeled inspection systems (option in AVICON – 14, -16, -31).

Understanding the growing importance problematic of welded rail joints inspection the our group of engineers traditionally pay special attention to an issue of automation of this inspection type. We designed and launched new devices – MIG-UKSM and AVTOCON-S, which provide the scanning of the welded joints zone using more than 80 channels.

Today the NDT equipment of "Radioavionica" JSC is operating all over the world. Negotiation with customers requests from us flexible technical solutions. Adaptation of the equipment to the customer's requirements needs the adjustment of software and hardware, and also an ultrasonic inspection systems. Primarily our willingness to meet the customers requirements allows us to develop a new devices and expand the sales geography.





COMBINED FLAW DETECTOR CAR AVICON-03M WITH ENHANCED FUNCTIONALITY

COMPLEX RELIABLE INSPECTION UP TO 250 KM OF THE RAIL TRACK DURING ONE INSPECTION WITH SPEED OF UP TO 60 KMH BASED ON 4 NON-DESTRUCTIVE INSPECTION SYSTEMS.

Ultrasonic inspection

- electro drive of moving up/down measure;
- remote control of inspection sliding device;
- 24-channel patented ultrasonic scheme (0°, 42°, 58°, 70°);
- contactless (magnetic) alignment of inspection sliding system;
- possibility of quickly remote activities (operating/settings);
- availability of 3 ultrasonic methods (echo-, mirror, mirror-shadow);
- signals registration via 3 mm by length and via 1 mm by height of rail;
- signals analysis on 8-amplified levels;
- defects detection an early stage;
- detailed inspection protocol sending by GPRS from the car.

High performance magnetic channel

- flaw detector trolley with magnetizing system on wheelsets axles;
- powerful stable magnetic flux in a rail (not less 9 mWb);
- detection of the rail breaks and critical defects with depth up to 8 mm at any climatic conditions (from -40° to +50°C) and speed of up to 70kmh;
- differentiation of the internal defects and surface damages;
- exact data linking of signals to rail track (with accuracy to sleeper + odometer+ GPS).

Video registration of rail track and rail infrastructure

- availability of 6 color video cameras (3 for each rail);
- availability of 6 reviews video cameras (infrastructure facilities);
- synchronization of video frame with flaw detector signals with accuracy up to 1 mm;



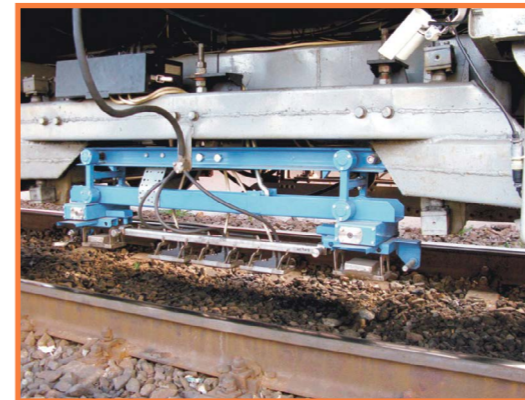
- surface defects detection with measurement of dimensions;
- analysis of the rail's condition, braces, bolted and welded rail joints, track switches;
- possibility of video monitoring facilities of rail infrastructure;
- economical flash lighting;
- exact frames at any work conditions.

Measurement of short irregularities of rail surface

- 4 micromechanical accelerometers - gyroscopes (on axle nodes of trolley);
- measurement the short vertical irregularities (on base 1 m);
- sensors of the linear movements;
- exact synchronization with inspection signals and cameras;
- automatic detection of surface irregularities with an inspection report.

Automation

- automatic defining track switches, bolted and welded rail joints;
- automatic measurement of the dimensions jointed gaps with defining non-normative gaps;
- contactless measurement temperatures of rails and joint gaps for forecast the condition of rail lengths.



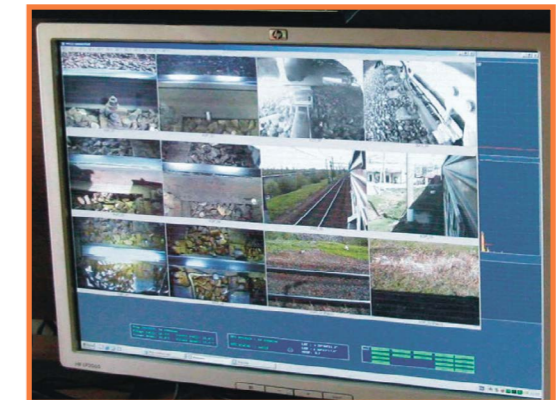
Update configuration of inspection sliding device



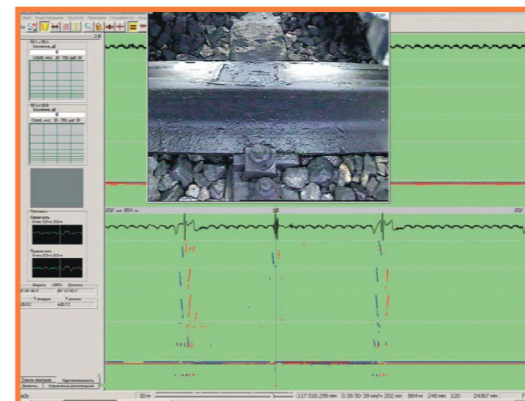
Detection of maintenance faults



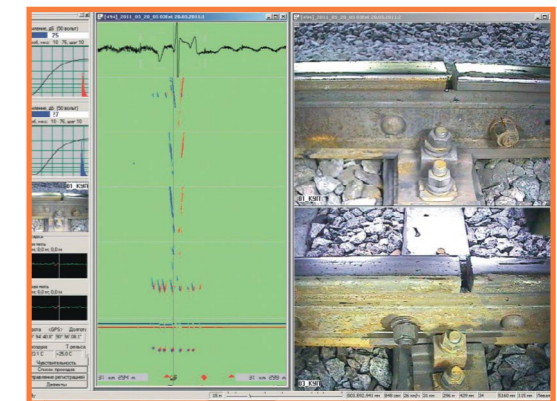
Possibility of remote activities (setting, operate, signal analysis)



2 channel system of video registration rail track: 6 cameras for rail; 6 review cameras (infrastructure)



Four methods of inspection: acoustic, magnetic, visual, measurement of surface irregularities



Synchronic analysis of inspection signals from cameras could make defectograms decoding easy





MOBILE DIAGNOSTIC COMPLEX



COMPLEX RELIABLE INSPECTION UP TO 250 KM OF THE RAIL TRACK DURING ONE INSPECTION WITH SPEED OF UP TO 60 KMH BASED ON 6 NON-DESTRUCTIVE INSPECTION SYSTEMS

- Ultrasonic inspection
- Magnetic inspection
- Testing geometric parameters of track line
- Testing geometric parameters of railhead profile
- Video inspection of the rail and braces condition
- Measurement of rail irregularities by inertial methods

MAIN BENEFITS OF MOBILE DIAGNOSTIC COMPLEX

High reliability of rail's defects detecting:

- 24 channel ultrasonic scheme with four methods of ultrasonic inspection and patented inspection modes;
- defects detection under the surface of the railhead by magnetic channel at temperature - 50 C;
- complex analysis of diagnostic information by acoustic and magnetic defectogram and video frames;
- localization sectors of the track with corrosion damage of the rail foot;
- contactless (magnetic) alignment of inspection system concerning to rail longitudinal axis.

Video reporting of rail's elements

- different types of cameras for video documentation of rails condition, rail braces, bolted and welded joints and elements of track switches (speed of up to 65 kmh);
- high quality of image due to economical flash lighting of camera and system of protective shutters at any climatic conditions;
- program regulation of additional lighting brightness, also directions of review and optical zoom of operated video cameras;
- video information transmission for future monitoring of rail track condition and infrastructure facilities.

Automation of handling diagnostic information:

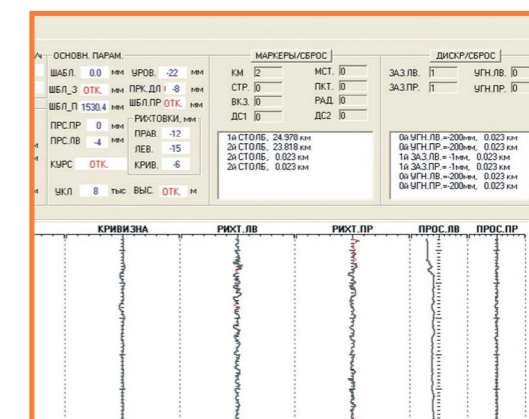
- output of information processing results of the track geometry control system with determination of deviation from the standards;
- synchronization of the inspection signals with video information;
- automatic defining of bolted, isolated and welded joints, track switches with protocol generation;
- automatic determination gap's value of bolted joint;
- synchronic analysis of current and previous inspection (monitoring of the flaws and rail's condition developing);
- automatic search of the track's sections with absence acoustic contact;

- recording of inspection protocol, telegrams for the purpose of changing of high defective rails and subsequent transmission it via GPRS from the car.

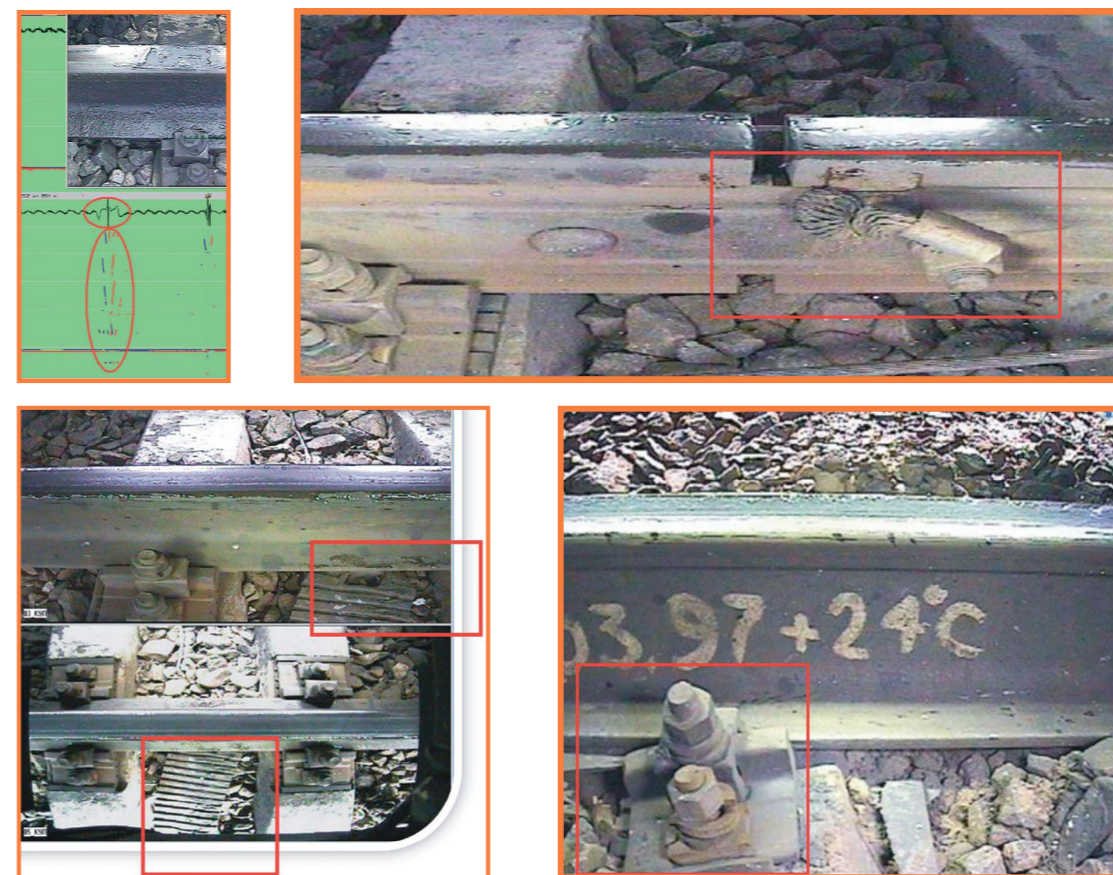
Minimization of maintains expenses:

- contactless sensors for measurement of rail track geometry;
- contactless (magnetic) alignment of the inspection system concerning to rail longitudinal axis;
- electro drive for moving up/down of inspection system;
- pneumatic drive of moving up/down acoustic units and magnetic sensors;
- displaying an information about consumption and temperature of couplant;
- two cameras for looking after the inspection system during testing;
- comfortable living and working conditions of the crew.

Inspection of track's configuration



Detecting track's faults



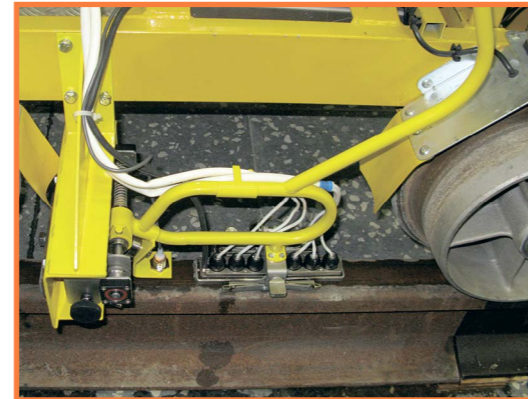


SELF-PROPELLED TROLLEY FOR ULTRASONIC RAIL INSPECTION AVICON-16

ULTRASONIC INSPECTION ON SPEED OF UP TO 10 KPH WITH COMPLETE REGISTRATION OF SIGNALS

Most effective on inactive areas and approach lines

- inspection up to 50km of rail track per shift;
- forward/back movement from accumulator drive;
- convenient control of movement and submissions of couplant (control desk);
- removal/installation from the rail line during 10 min by two operators with special equipment;
- 20 ultrasonic channels (0°, 42°, 58°, 70°) and 3 methods of NDT;
- patented ultrasonic inspection scheme;
- real-time display of defectogram and inspection parameters;
- operation modes: rail cross section with defects (Mnemonics), A-scan and B-scan;
- marking apparent defects by spray gun during moving (automatically or manually);
- sensors of the track switches and bolted joints;
- multilanguage program interface;
- temperature range from -20° to +50°;
- cruise speed up to 25 km/h (possible 200 km of the rail track on single battery charge);
- consist of the manual probes, sample for setting, spear parts;
- protective cover, windscreen, headlight for nighttime.



Possibility of using slide or wheel ultrasonic probes



Decision-making of detected defect during inspection period

DUAL-LINE FLAW DETECTOR AVICON-31

NEW INTELLECTUAL FLAW DETECTOR

Key features

- new unit of inspection and indication BUI-31;
- color display 8";
- touch control;
- reliable digital communication;
- GLONASS/GPS, Wi-Fi, GPRS;
- microphone, video camera;
- IP54, low level of power consumption;
- new of ultrasonic multi-channel unit BUM-3204;
- availability of 32 inspection channels;
- several ultrasonic frequencies;
- possibility to connect the scanner.

INNOVATION FUNCTIONS

Work preparation

- Registration of the setting process by test unit (CO-3P);
- Check up of probe's efficiency;
- Several ultrasonic inspection schemes;
- Improved frame (by 11 points) and increased reliability of elements and units;
- Connect of sliding systems and wheel inspection systems.

Searching defects

- Big color display with possibility of signals decoding on-route;
- Automatic signal decoding on-route and reporting to operator;
- Magnification of signals in mode "Bolt hole";
- Automatic increasing of sensitivity in bolted joint zone;
- Inspection of defects under the rail surface and the evaluation of damage's sizes using special scanner;
- Manual transducers 2.5 and 5 MHz.



Technologies performance

- Possibility of quality record due to constant monitoring of signals on B-scan;
- Quality evaluation of flaw detector settings directly during inspection (be regular reflectors);
- Operator warning of approaching flaw section (preliminary transfer from database);
- Inspection of acoustic contact under each probes;
- Recording of GPS-coordinate;
- Registration of inspection speed
- Registration of air temperature.

Decrypting

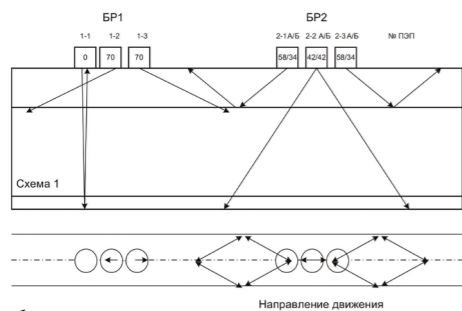
- Recording of the separate photos, videos, and signal comments with linking to track coordinate;
- Automatic decrypting;
- Automatic searching of not inspected sections;
- Possibility of data transmission using network operators;
- Wireless data transfer as well from track line;
- From -12 dB to +18dB - signal registration concerning to operating.



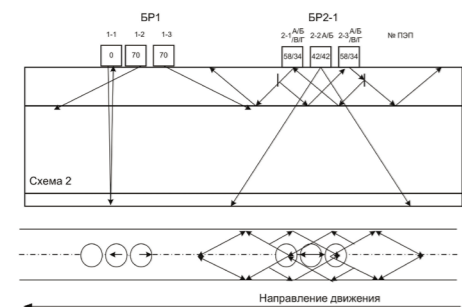


Ultrasonic inspection schemes

Scheme 1 «Standart» 12 channels, separate RHOMBUS-scheme, 2 channels «70»



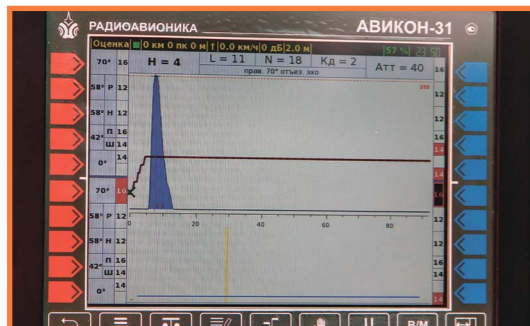
Scheme 2 «Head» 14 channels increasing of the railhead control by RHOMBUS+-scheme



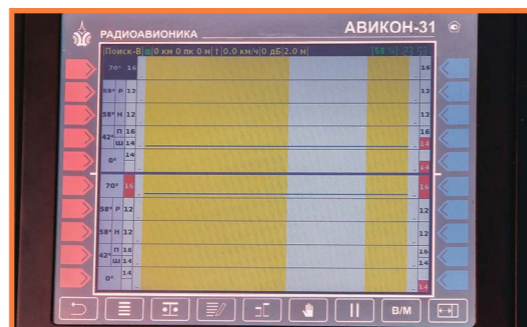
Display information Mnemonic



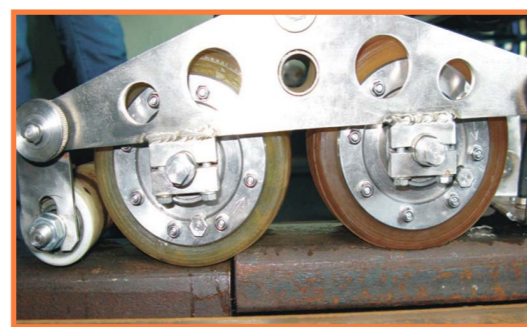
Signal evaluation in mode A+B-scan



B-scan in real-time



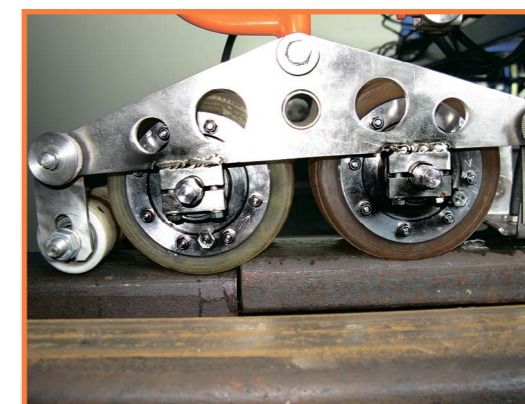
Using wheel inspection system



Scanner connecting



MODERN DUAL-LINE FLAW DETECTOR AVIKON-14

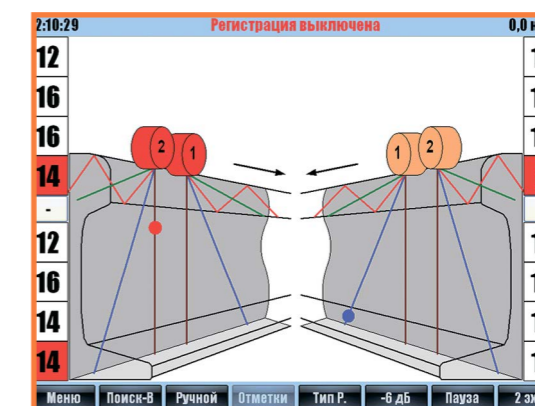


EFFECTIVE INSPECTION OF RAILS WITH UNSATISFACTORY SURFACES IN MODE "DEFECTOGRAMS DECODING (DECRYPTION)" ON SPEED OF UP TO 5 km/h.

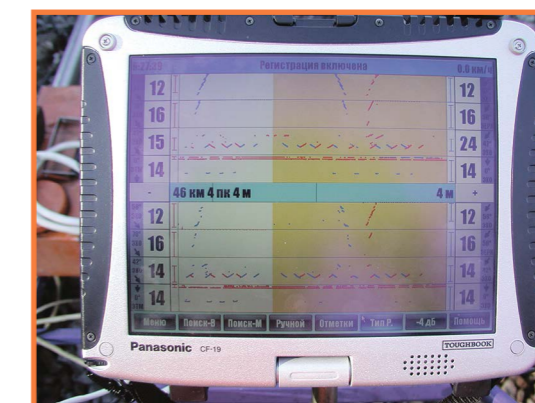
Reliable inspection of rail's end parts in the bolted joints zone, including with "steps"

THE BEST FLAW DETECTOR AMONG ANALOGS OF DETECTING DEFECTS: 19 DEFECTS/1000 km

- 28 channels of ultrasonic scheme (0, 42, 58, 65);
- possibility of switching wheel probes (summer time) and sliding probes (winter time);
- large color touch-sensitive screen;
- total control of rails in mode "Defectograms decoding" on higher sensitivity or in common mode "Mnemonics";
- 7 manual inspection channels (with manual transducers);
- real-time display B-scan by all channels, A+B scan by one channel, with graphical defect position display (mnemonics), A-scan;
- the technical solutions are protected by 7 patents;
- stable acoustic contact on different types of the rails (rough, surface defects, worn out railhead, corrosion, joint steps);
- reliable inspection of the bolted joints zones (crack detection in bolt holes which is not available for other flaw detection units);
- deficiency of mechanical wear of transducers inside wheel: stable control parameters, not required often calibration, long life time expectancy;
- supplied with two types of ultrasonic inspection system (sliding and rolling), two batteries, spare parts and accessories, sample for setting



Mode "Mnemonics" – intuitive clear picture of defect on the rail sections



Mode B-scan – defects detecting directly on-way without waiting defectograms decoding





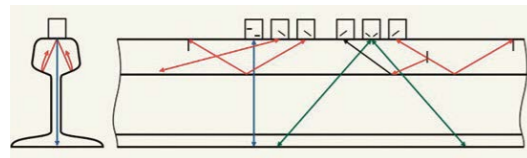
DOUBLE-LINE FLAW DETECTOR AVICON-11

RELIABLE AND TIME-PROVED DUAL-LINE FLAW DETECTOR DISPLAYING INSPECTION DEFECTOGRAM ON THE SCREEN

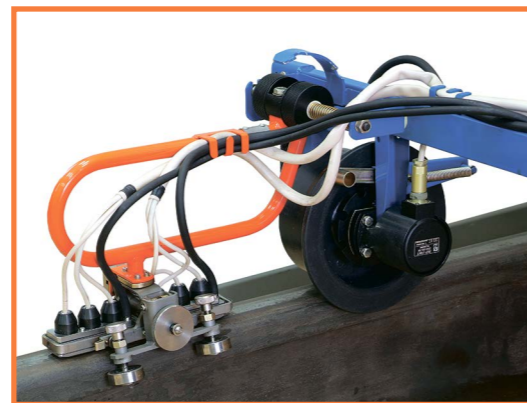
- reliable 24-channel ultrasonic scheme (0°, 42°, 58°, 70°);
- inspection of both railhead sides using echo and mirror methods;
- reduced dimensions and weight (42 kg without couplant);
- semi-automatic inspection adjustment;
- availability of 13-level recording of echo-signal amplitude (from -6dB to +18dB);
- signal recording in 2 mm over track length and in 1 mm over rail depth;
- real-time display B-scan;
- 3 modes: "Mnemonics", "B-scan" (for all channels), "A+B-scan" (for each channel);
- recording results to a USB memory stick;
- wide possibilities to input additional markers and bind track data and defect rail sections;
- 6 manual inspection channels;
- convenience display program with noise filter.



B-scan by all channels on the screen



Ultrasonic scheme AVICON-11

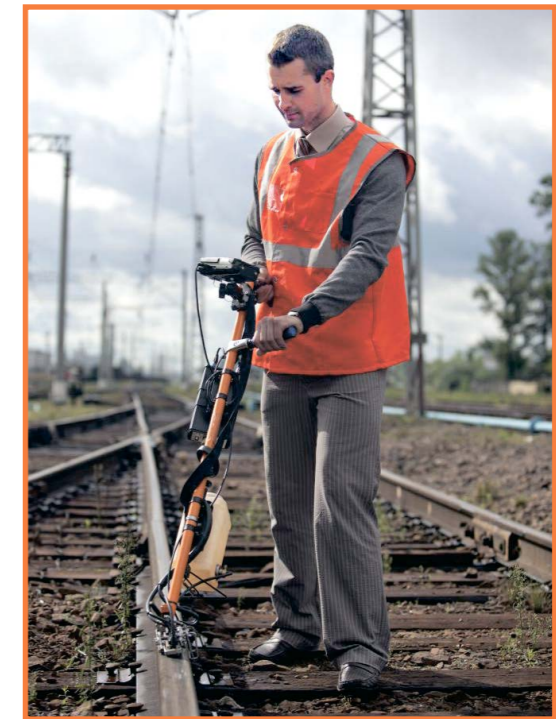


Ultrasonic inspection system with semi-automatic centering

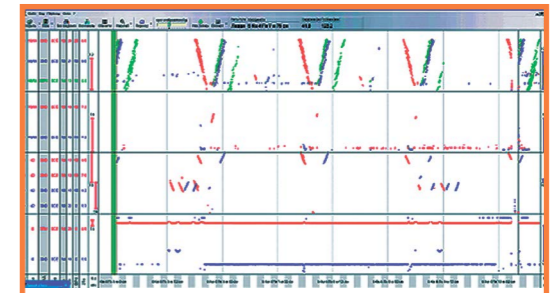
FLAW DETECTOR FITTED ON A STICK WITH SIGNAL REGISTRATION AVICON-15

DESIGNED FOR INSPECTION:

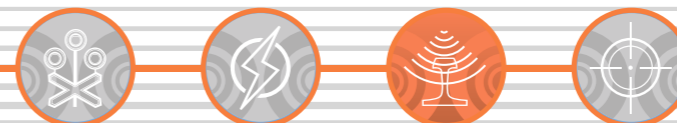
- local rail lines (up to 200 m);
 - confirmed testing according to removable and portable devices;
 - track switches;
 - station track lines;
 - bridges and tunnels;
 - rails from minimum reserve stock.
- complete 11-channel ultrasonic scheme (0°, 42°, 58°, 70°);
 - defect detecting immediately during testing on "B-scan";
 - original structure of alignment system (clamping to gauge and field sides of the rail head);
 - availability 3 check methods (echo, mirror and mirror-shadow);
 - simultaneous inspection of gauge and infield railhead sides using echo- and mirror methods ("ROMBUS+"-scheme);
 - multi-level signals registration (from -6dB to +18dB);
 - B-scan on all channels or one channel, A-scan on selected channel;
 - analysis of signals with high sensitivity and detecting defects on early stage;
 - 7 manual probes (0°, 45°, 50°, 58°, 65°, 70°);
 - light weight (8 kg) and overall dimensions;
 - quick semi-automatic adjustment.



Convenience display program



Operating and indicative block based on compact protective PC

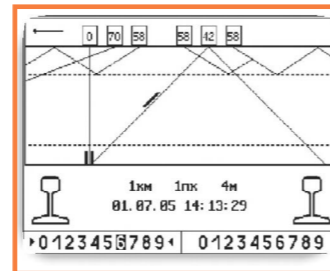




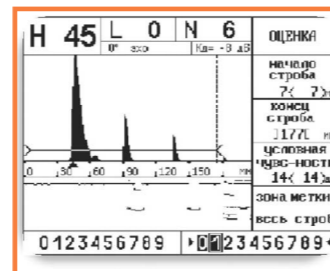
SINGLE-LINE ULTRASONIC FLAW DETECTOR AVICON-12

IDEALLY SUITABLE FOR RAIL TRACKS OF THE INDUSTRIAL PLANTS, TRACK SWITCHES, STATION LINES, BRIDGES, TUNNELS, APPROACH LINES, CRANE TRACKS, FOR CONFIRMED TESTING

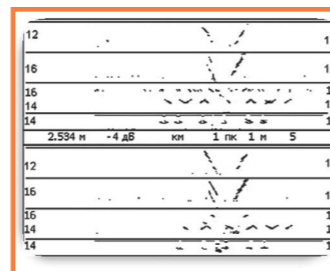
- function possibilities correspond to flaw detector AVICON-11 (for 1 rail);
- 12-channel ultrasonic scheme (0°, 42°, 58°, 70°);
- inspection of both railhead side by echo- and mirror methods ("ROMBUS+"-method);
- multi-level signals registration;
- real-time displaying of B-scan with high sensitivity;
- possible modes: Mnemonics, B-scan by all channels, A+B scan (single-channel mode);
- wide possibilities to analyze inspection signals in the display program;
- detailed inspection report;
- 6 manual ultrasonic channels for clarifying defect sections;
- light weight and overall dimensions;
- operating temperature from -40 to +50.



Mnemonics



A+B scan



B-scan by all channel



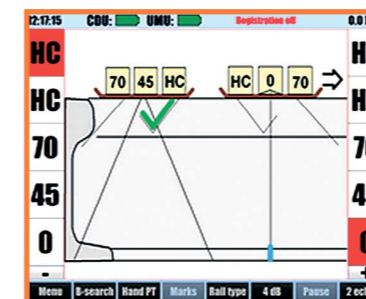
Easy transportation

SINGLE-LINE FLAW DETECTOR USK-004R WITH MICRO CRACK DETECTION

FLAW DETECTOR WITH DETECTION AND EVALUATION OF MICRO CRACKS IN THE RAILHEAD (DEFECTS TYPE "HEAD CHECKING")

- effective for the rail defects detection, including micro cracks "HC" type, developing in area "rail-wheel";
- 10 channel ultrasonic scheme (0°, 45°, 70°, special "HC" sensors), echo- and mirror-shadow methods;
- special algorithm processing and displaying signals from "HC" defects on gauge and field sides of the railhead;
- complete registration and multi-level signals display;
- storing of the inspection results in memory stick according to complete B-scan;
- large (10") color touch sensor display;
- A-scan and B-scan display with defect-detecting possibility at noise background and regular reflectors;
- preview of the defectograms with high sensitivity for detecting defects at early stage;
- recording GPS coordinate.

Jointed development with MAV KFV kft (Hungary)



Mnemonics railhead with defect and worked channels



Simultaneously display A+B –scan for selected channel





FLAW-DETECTOR AVICON-17 FOR DETECT CRITICAL DEFECTS IN RAILHEADS

DESIGNED FOR:

- manual confirmed testing of the separate sections and welded joints by manual probe;
- detecting internal defects in the railhead under surface damages using special scanner;
- building-up of 3D defected railhead image;
- monitoring of defected rails.

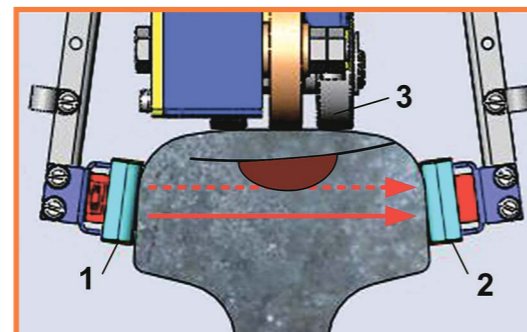


Reliable detection internal defects in the railhead under surface damages:

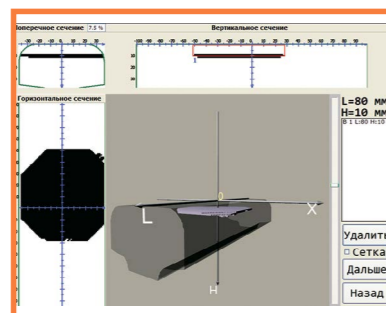
- careful scanning of the rail head from sides by layers during 5min;
- automatic sensitivity adjustment;
- determination of real sizes and configuration of internal defects in railhead;
- monitoring of defecting rails with an inspection report;
- prolongation of the rail operation life.



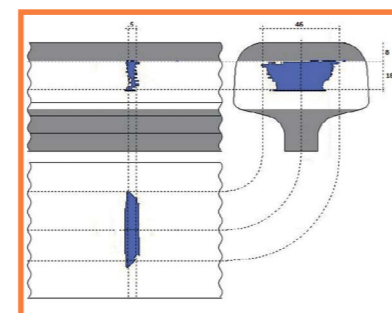
- Inspection by manual probes (0, 45, 50, 58, 65, 70) with registration
- welded rail joints;
- separate rail sections according to removable and portable NDT devices;
- display signal: A-scan or B-scan;
- inspection report.



, 2 – block resonators; 3 - encoder



protocol with dimensions and geometry of internal defect in the railhead

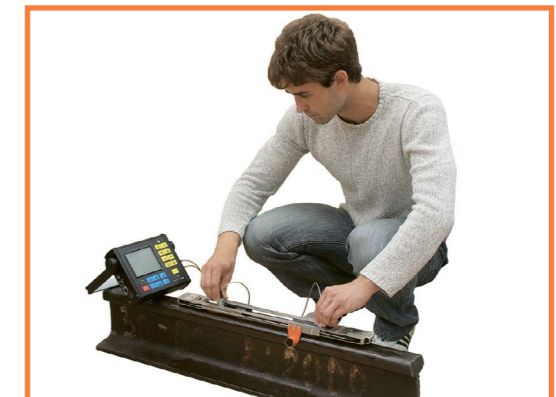


picture of railhead with defect

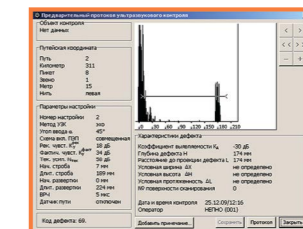
PORTABLE FLAW DETECTOR AVICON-02R

SIMPLE AND USER-FRIENDLY FLAW DETECTOR FOR MANUAL INSPECTION IN FIELD AND PLANT CONDITIONS:

- separate rail sections;
 - welded rail joints;
 - responsible metal products.
-
- semi-automatic sensitivity adjustment;
 - integrated testing programs of the separate rail sections and zones;
 - modes: A-scan, B-scans, screen-shorts;
 - recording of the inspection results;
 - inspection of the flash and aluminothermy welded rail joints;
 - defectograms recording (B-scan) by any channel;
 - possibility of connect stick with encoder (by separate order);
 - data transfer to PC, printing of inspection report;
 - possibility of testing wide range of the metal goods.



Large scale display signals on PC



AVICON-02R/PC – new functions of flaw-detector due to connect PC with special software;

- display signal on large touch sensor screen;
- color shading of registered signals amplitude;
- convenient measurement of the defects parameters;
- inspection protocol preparation;
- database creation.



Welding inspection by mirror method using scanner SATS-02R (supplied with)

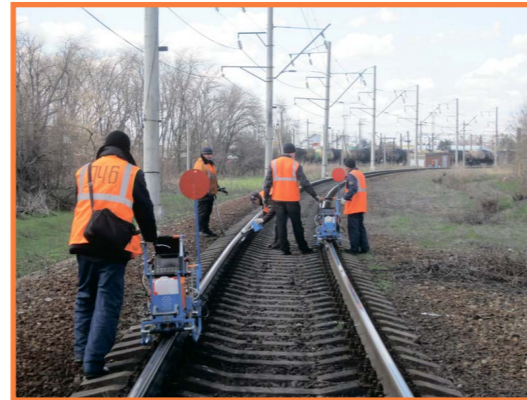




MULTICHANNEL FLAW DETECTOR MIG-UKSM FOR ULTRASONIC INSPECTION OF WELDED JOINTS

EFFECTIVE INSPECTION OF THE FLASH WELDED JOINTS WITH HIGH CAPACITY AND INSPECTION REPORT

- ultrasonic inspection of the weld joints along the rail section (including rail foot blades);
- high efficiency (3-4 min. per 1 joint; up to 70 joints per shift);
- 108 inspection channels(0°, 42°, 58°, 70°);
- automatic checking acoustic contact under all acoustic units;
- system of prompts to operator by inspection stages;
- recording GPS-coordinate of welded joint;
- inspection protocol on each joint.



Modes of inspection weld joints:

ECHO
50°
inspection step 3-5 mm
inspection time for one joint 20 min
inspection method: ECHO
TRANSDUCER ANGLE INPUT: 50

Manual probes

ECHO MIRROR
45° 70°
inspection time for one joint 3-4 min
Inspection methods:
• ECHO
• MIRROR
• DELTA
Inspection schemes:
• «SNAKE»
• «RHOMBUS»
• «70 degrees»
TRANSDUCER ANGLE INPUT: 0, 45,58,70

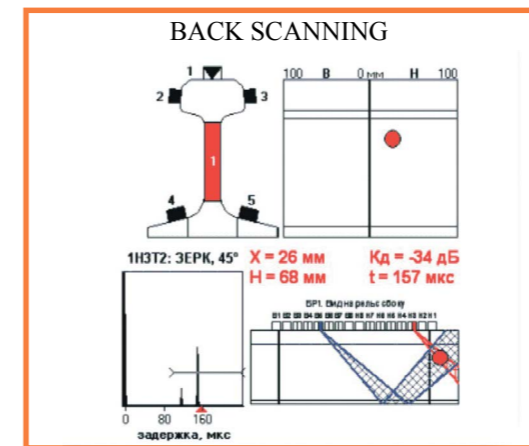
Flaw-detector MIG-UKSM

- availability of 5 acoustic units (on head and rail base point);
- availability of 3 methods ultrasonic inspection (echo-, mirror, delta);
- joint inspection for 4 stages: static – forward/back, scanning – forward/back;
- providing results: defect on the rail image,

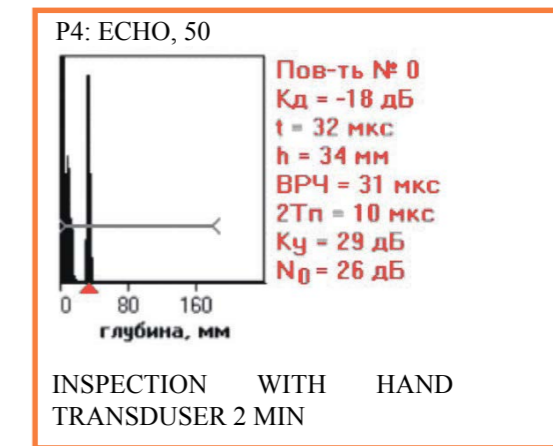
- A- and B – scan, parameters of flaw detector setting and detected defect;
- analyzing results of scanning on B-scan with high and nominal sensitivity (-6 dB and 0 dB);
- registration of the welded joint temperature;
- detailed analysis of results on flaw detector screen or computer.

Display inspection results of weld joints:

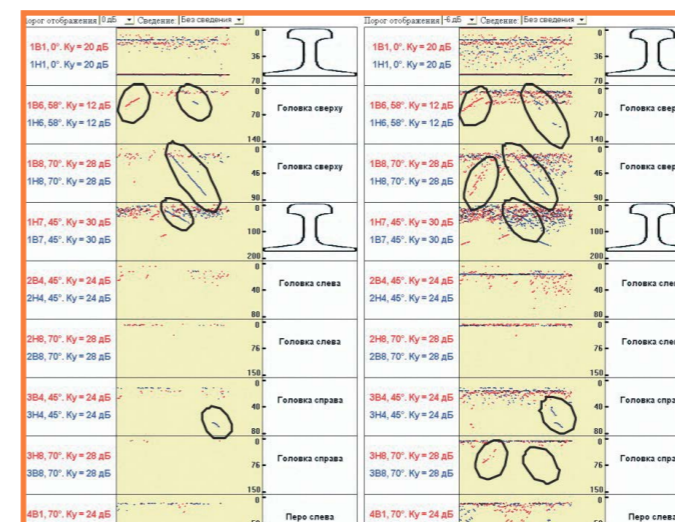
1.Static mode: ultrasonic inspection of the joint from two sides by mirror method
Defect on rail section + A-scan



3.Possibility of clarify defect by manual probes



2.Scanning: ultrasonic inspection of the joint sides by echo-method
B-scan with nominal and high sensitivity





INSTALLATION OF AUTOMATED INSPECTION OF THE WELDED RAIL JOINTS AVTOCON-S

ONE-OF-A-KIND

DESIGNED FOR AUTOMATED ACCEPTANCE INSPECTION OF WELDED RAIL JOINTS ON RAILWAY PLANTS

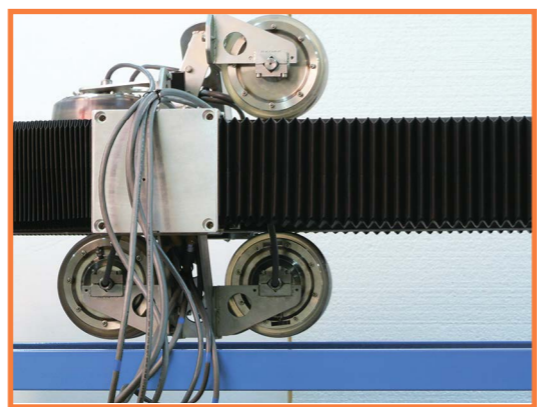
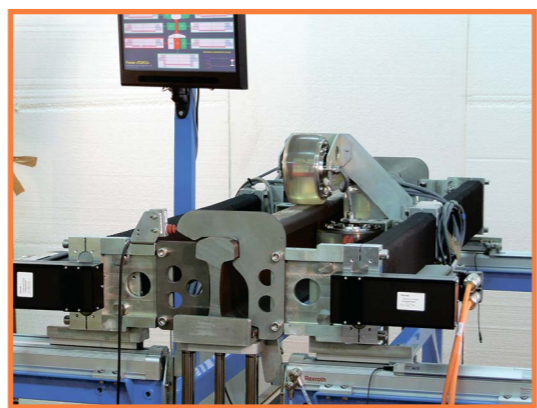
Consist of:

- carrying frame with scan device;
- 8 ultrasonic wheel probes;
- control device of pneumocylinders and linear scanners;
- control PC;
- displaying of inspection results;
- video cameras and additional devices.

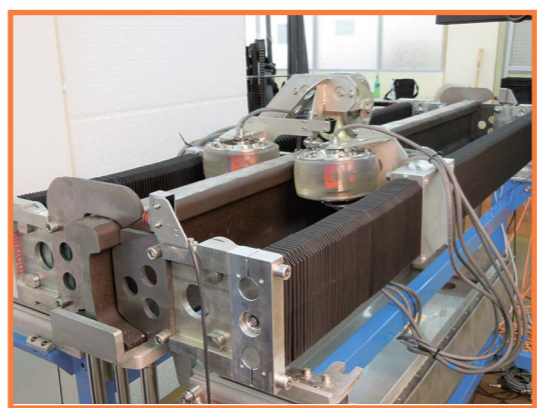
Distinctive features of equipment:

- increasing of testing capacity in three times (inspection time of one welded joint – not more 3 min);
- minimization of human factor;
- detailed inspection protocol of each welded joint;
- 84-channel ultrasonic schemes;
- three methods of ultrasonic inspection (echo-, mirror and mirror-shadow);
- all benefits of the probes: qualitative acoustic contact, insensitivity to rough surface, long life expectancy, not required often settings.
- detecting implicit defects of the welding;
- display signals: mnemonic image of the rail with defect indication, B-scan, A-scan;
- indication of flaw detector setting and detected defect parameters;
- measurement of rail straightness in welded joint area by electronic scale;
- measurement of hardness rail metal in welding area;
- taking a photo of the welded joint surface;
- data transfer to plant server;
- technical solutions are patented by 4 patents.

AVTOCON-S IS IMPLEMENTED ON THE RAIL PLANT (SAINT-PETERSBURG)

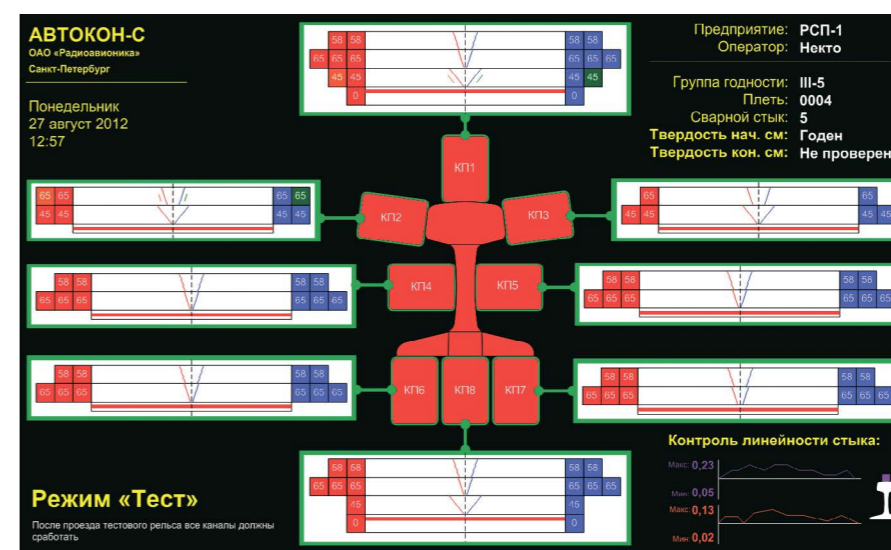


8 ultrasonic wheeled inspection system on 6 rail surfaces (head, web, foot)

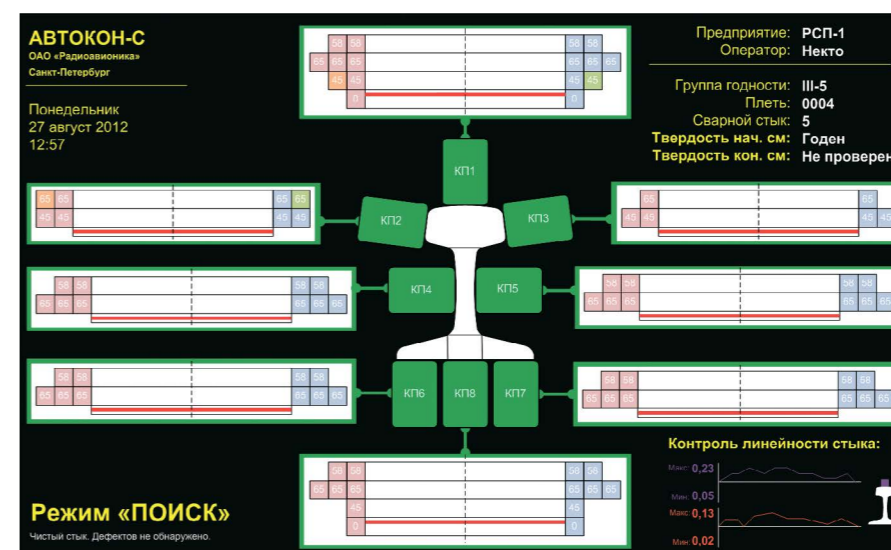


Operation position of ultrasonic probes during inspection

- **Innovation technical solutions in AVICON-S are:**
- full automation of welded rail joints scanning;
- application of new input methods of ultrasonic oscillation in rail using ultrasonic probes;
- complex diagnostic of welded rail joint quality (flaw detecting, geometry measuring, measuring of metal hardness);
- taking a picture of number and surface state of welded joint;
- registration of the parameters and inspection process with detailed protocol;
- possibility to transfer diagnostic information to central server for making rail electronic passport.



Displaying inspection results: view of the rail and wheel with indication of the defective rail section





EQUIPMENT FOR WELDING PLANT MIG-UKSM/RSP

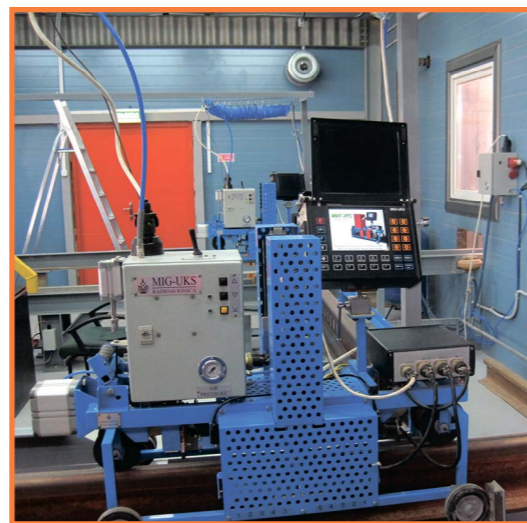
AUTOMATIC INSPECTION OF THE WELDED JOINTS ON RAILWAY PLANTS

MIG-UKSM/RSP is implemented on rail plants:

- Moscow;
- Azerbaijani Republic;
- Libya.

Distinctive features:

- all function possibilities of flaw detector MIG-UKSM;
- high capacity (3 min. per one joint);
- pneumatic clamp of all 5 acoustic units to the rail (by pushing one button);
- ultrasonic inspection of welded joint across the whole rail section (including rail foot blades);
- receiving of the inspection document of each joint;
- 108 automatic channel and 9 manual inspection channels;
- 3 NDT methods (echo-, mirror, delta);
- temperature indication of welded joint;
- availability of the information help to operator;
- display inspection results: rail section defect, A- and B-scan;
- analyze of scanning results of the welded rail joints with high and nominal sensitivity (minus 6 dB and 0 dB);
- recording of inspection results in the flaw detector with possibility to transfer them to computer and print the protocol;
- testing of the performance of the flaw detectors parts;
- operating temperature from 0 to plus 50°C.



FLAW DETECTOR COMPLEX BASED ON FLAW DETECTOR AVICON-02R/PC

COMPLEX IS DESIGNED FOR ULTRASONIC INSPECTION IN PLANT CONDITIONS:

- Flash welded rail joints;
- Separate rail sections;
- Other metal goods.

Distinctive features:

- special software;
- ultrasonic methods: echo, mirror and mirror-shadow;
- semi-automatic inspection adjustment;
- maximum scanning time – 800mks;
- maximum depth of ultrasonic testing (into steel by longitudinal wave) – 2300 mm;
- simultaneous and separate display of the signals in terms of A and B-scan on large display;
- display and registration of signals with nominal (0 dB) and high (12 dB) levels of sensitivity;
- multi-level recording of the signals amplitude and color shading of registered signals amplitude;
- precise measuring of defects parameters by A+B – scan;
- automatic generation of inspection protocols and database on PC;
- entering electronic information database directly from keyboard or display (if complex supplied with sensor display);
- transfer of inspection protocols and passports to common server of plant.





INSTALLATION FOR INPUT INSPECTION OF RAILS AVICON-11RSP/VS

DESIGNED FOR INPUT INSPECTION OF THE USED RAILS ALONG ALL SECTION (INCLUDING RAIL FOOT BLADES)

On rail plant:

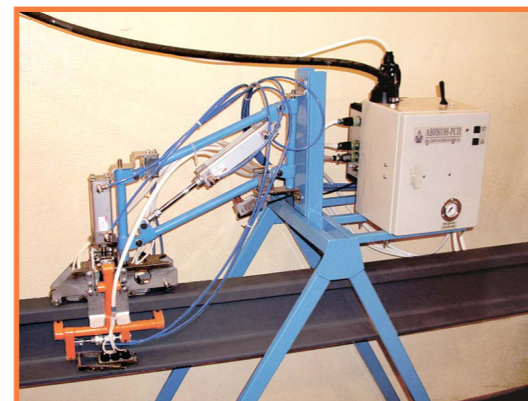
- Yaroslav", North railway;
- Tihorezk, North-Kuakas railway;
- Station Promishlennaya, East-Siberia railway;
- Moscow, Oktyabrskaya.

Equipment consists of:

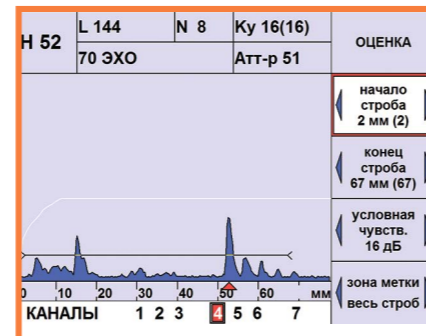
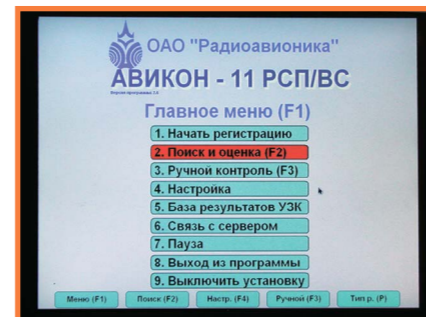
- ultrasonic inspection system with encoder;
- ultrasonic multichannel unit;
- pneumatic drive and stationary rack;
- computer with LCD display.

Function possibilities:

- 1100% inspection of all rails section;
- operation of equipment using computer;
- semi-automatic signals adjustment;
- saving inspection results in database;
- 17 ultrasonic channels, 3 inspection methods (echo, mirror, mirror-shadow);
- inspection of the railhead by schemes "RHOMBUS" and "70";
- inspection of rail foot blades by echo-and mirror modes;
- decrypting of signals by B-scan in real-time on large display and with high sensitivity
- display information modes: inspection signals on the rail section, B-scan on all channels, A+B-scan on channel;
- manual testing by probes of the separate sections with signals registration;
- operation 24/7;
- life time expectancy – 8 years.



Pneumatic drive for installing ultrasonic inspection system on the rail track



NON-DESTRUCTIVE TESTING LABORATORY "RADIOAVIONICA" JSC

OUTSOURCING OF NDT

Certificate of NDT laboratory attestation 56A050325, 20.04.2015

There are all allowing documents and specialists of 2-nd and 3-d (highest) levels by NDT.

Flaw rail detection – all range of tasks:

Complete rail inspection by:

- mobile devices;
- portable devices;
- special devices;
- testing of track with low traffic and separate sections;
- inspection of the welded rail joints;
- testing on the railway plants.



Constant and reliable operations.

- without vacation and medical certificates.

Warranted quality:

- modern devices;
- high qualified specialists;
- inspection by independed company.

EXPERIENCE OF RENDERING SERVICES JSC «RADIOAVIONICA»:

1. Section of the rail track Pola-Dno Oktyabrskaya railway. 500 rail sections were inspected with surface defects. 5 dangerous rails were detected and taken under observation 3 defective rails.
2. Inspection of the industrial rail tracks of company Sibur;
3. Marine trade port "Us't-Luga", JSC "Us't-Luga Oil";
4. JSC «PUL TRANS»;
5. JSC «Baltic Shipyard»;
6. JSC «GasEnergostroy»



Benefits for railway and industrial plant

Savings on:

- equipment;
- metrological certificate of devices;
- organization and support of working places
- (staff salary, education, overhead expenses);
- unreasonable rail renewal with nonhazardous damages;
- devices maintenance.

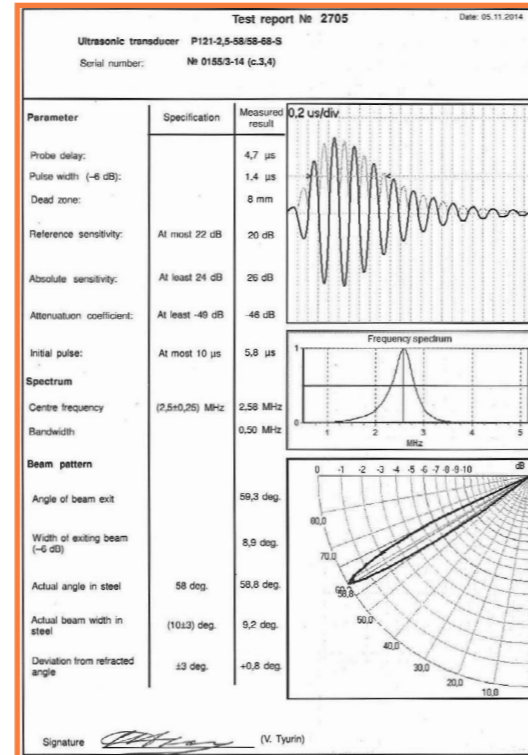




ULTRASONIC PROBES FOR TESTING OF THE METAL CONSTRUCTIONS

Radioavionica" JSC produces and supplies removable and manual piezoelectric probes AVICON type detectors.

All produced transducers have individual passports with measurement parameters which added into data base of software-hardware complex.



Upper half of removable probe has marks direction of ultrasonic inspection of every piezoelement for centering removable probe during its fixing into block housing.

Every probe has individual passport with technical characteristics, supplied in individual package with zip-lock.

TRAINING COMPLEX AVICON-11T

FOR LEARNING AND PRACTICING OF SKILLS AT REMOVABLE FLAW DETECTORS ACCORDING TO TECHNOLOGIES OF THE RAILS INSPECTION AND DECRYPTING DEFECTOGRAMS

- checkup and attestation of operators' knowledge and skills with annual estimate;
- two education modes: "Education" and "Exam";
- imitation of rail inspection process;
- simulated defect situations during rail inspection on the way at foot and checking correct operator actions;
- education process practically does not differ from operation with the flaw detector en-rout;
- display rail track with elements of bolted and welded joints, point machines, kilometer and miles stones;
- more than 800 objects in base (defects, constructive deflectors and e.t.c.);
- practicing of operating skills on dismantlable ultrasonic flaw detectors for complete rail inspection;
- virtual gate and searching defects at real signals in fact of B-scan;
- inspection modes: A-scan, A+B-scan on single channel, signals on the rail cross section, B-scan on all channels;
- allow to detect and estimate defect parameters;
- examination protocol with indication all operator's mistakes;
- supplied with manual probes, sample for setting, two batteries, spare parts, display program signals for PC.



Imitation of rail control process installed into the rail





TRAINING CENTER FOR NON-DESTRUCTIVE TESTING OF THE RAILS NON-STATE EDUCATIONAL ESTABLISHMENT OF ADDITIONAL PROFESSIONAL EDUCATION «RADIOAVIONICA»



The license for educational activity 78 № 001393, 11 July 2012 r.



There are 7-9 groups by directions of education during one academic year.

- Training of defectograms descriptors of the removable and mobile NDT devices (3 weeks).
- Executive training of defectograms descriptors (2 weeks).
- Exploitation и maintenance of the flaw detectors AVICON. The rules of the defectograms decrypting (2 weeks).
- Ultrasonic inspection of the weld rail joints using multi-channel MIG-UKSM and portable flaw detector AVICON-02R (2 weeks).

- Since 2003 year we've prepared more than 3300 specialists of the rail NDT from 16 different railways of JSC RZD; SPB, Moscow and Baku subways, large Russian industrial enterprises, Ukraine, Belarus, Kazakhstan, Azerbaijani Republic, Estonia and Lithuania railways;
- Education is managed by high qualified lecturers: Doctor of Sciences and PhD, senior designers of NDT devices;
- The quality of education is increased by modern facilities: electronic desk, computer class, samples of new flaw detectors, sample of the rail with defects;
- Each student has tutorials, references, CD-discs with programs and necessary information for work;
- There is effective exchange of experience between specialists from different railways and designers during education;
- Annual flow – 200-300 students.





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