

IZOLYATOR *120+1*

Century-old traditions — state-of-the-art technologies

No. 1/2018 (16) January — March, 2018

WE UNITE INTERNATIONAL EXPERIENCE IN POWER INDUSTRY



IZOLYATOR — THE WINNER OF THE TENDER
OF THE POWERGRID FOR SUPPLY
800kV/2000A AND 420kV/3000A
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WE UNITE INTERNATIONAL EXPERIENCE IN POWER INDUSTRY



ALEXANDER SLAVINSKY

Chairman of the Board of Directors, Izolyator, Russia's Representative in CIGRE SC D1, Vice-President of TRAVEK International Association, Russia's expert in IEC (Permanent Committee 36A), Head of SC D1 RNC CIGRE.

Izolyator is celebrating 122 years since its foundation. The modern world is changing every second, however some principles, which stay unchanged, are of some special value for us: honesty, reliability and continuous improvement. In its over a century-long history, our company has retained a reputation of the largest and most reliable designer and supplier of advanced quality electrical products. We do our best to prove the trust of our clients.

PREMIER QUALITY FOR RELIABLE OPERATION

Today, Izolyator is a leader of electrical engineering in Russia. We are able to achieve targets, largely, thanks to the advanced technologies and innovative designs of high-voltage bushings that we actively implement and we are not ready to rest.

Power industry is one of the cornerstones of economy. It is important that the products, that it so depends on, were of top quality. Izolyator expands its product range constantly by introducing brand new designs, product and production process modernization. 12 000 high-voltage bushings is the production capacity of Izolyator

plant. Altogether, the company has produced more than 700 000 bushings that are installed and operate in more than 30 countries of the world in various operational conditions. Today, we pay special attention to advance develop-

ment, such as bushings with new RIN insulation, cable coupling sleeves and optical voltage transformers in our company.

IN TOUCH WITH LEADING SPECIALISTS

We believe, it is important to have exposure to the world's best practice and share own experience. The company collaborates with Russian and international organizations, actively contributes to Russian and international organizations, including CIGRE, IEC, TRAVEK, and is represented in the Academy of Electrical Sciences of Russian Federation. Besides, we have partner relations with a number of large global power equipment manufacturers.



Izolyator's activities in CIGRE, Council on Large Electric Systems, are an important development direction. The company is a leading science and technology partner to the Russian national committee of CIGRE and is actively engaged in activities of study committee D1 RNC CIGRE «Materials and Emerging Test Techniques», which is based at Izolyator plant.



In March 2018, Izolyator hosted a meeting of study committee D1 of the Russian National Committee of CIGRE (RNC CIGRE) «Materials and Emerging Test Techniques».

12 000 HIGH-VOLTAGE BUSHINGS IS THE PRODUCTION CAPACITY OF IZOLYATOR PLANT. ALTOGETHER, THE COMPANY HAS PRODUCED MORE THAN 700 000 BUSHINGS THAT ARE INSTALLED AND OPERATE IN MORE THAN 30 COUNTRIES OF THE WORLD IN VARIOUS OPERATIONAL CONDITIONS.



Video conference of study committee D1 RNC CIGRE at Izolyator plant

For the first time, the meeting was arranged as a video conference. This format allows to discuss actual problems and take decisions with participation of all study committee members from different cities of Russia and get in touch with experts from other countries. The meeting participants discussed preparation to the 47th CIGRE Session in and SC D1 activity plan in 2018.

An opportunity to make a contribution to the development of the world's power industry is one of priorities for our company. We are confident that cooperation with RNC CIGRE will enable our company to take its operation to a new level for the benefit of all market players and development of power industry of our country in general.

MUTUAL INTEREST

Our company carries on a fruitful cooperation with leading Russian, European and Asian power grid and electrical engineering companies. We give a special value to personal meetings at Izolyator plant among others.



Thus, in the first quarter of this year, Igor Shaynoga, Director General of the JSC "Management company "UNCOMTECH" visited our company. The business meeting was dedicated to coordination and strategic planning of joint activities in international cooperation development and organization of experience exchange between Russian and foreign generating companies and industrial enterprises, power equipment OEMs.



We had a productive meeting with President of Irito Group Alexey Reznikov and Chief Designer of Gzhel plant Electroizolyator Valery Rudy. We spoke about directions and prospects of possible cooperation, taking into account technical features and demands of our production in porcelain insulators.

In order to further expand international cooperation and set up new partner relations, our company held a series of seminars for repre-



Study committee D1 RNC CIGRE meeting participants at Izolyator plant, at the forefront. L-R: Executive Director RNC CIGRE Olga Frolova, Alexander Slavinsky and Vladimir Ustinov

WE ARE PLEASED TO HAVE AN OPPORTUNITY TO SHARE OUR UNIQUE EXPERIENCE WITH ALL OUR PARTNERS AND FIND IT TO BE PART AND PARCEL OF OUR MISSION — TO CREATE FOUNDATIONS FOR A STABLE AND SUSTAINABLE POWER SUPPLY IN THE WORLD.



Talks at Izolyator plant. L-R: Alexander Slavinsky, Konstantin Sipilkin, Alexey Reznikov, Irito Group's President and Valery Rudy, Chief Designer at Gzhel plant Electroizolyator



Meeting participants at Izolyator plant. L-R: Andrey Shornikov, Ivan Panfilov, Director General of the JSC "Management company "UNCOMTECH" Igor Shaynoga and Alexander Slavinsky

sentatives of world's leading electrical engineering companies and power companies in the first quarter of 2018.



Izolyator put forward an initiative of organization of an open seminar for Vietnamese power engineers with participation of leading Russian electrical engineering companies. This event gathered over 100 representatives of generating, power grid and industrial companies of Vietnam.

We are glad to have an opportunity to share our unique experience with all our partners and find it to be part and parcel of our mission - to create foundations for a stable and sustainable power supply in the world.

Development and strengthening of partner relations with Russian and global power grid companies and power equipment manufacturers is one of our primary goals!

PROVEN TRUST OF PARTNERS WORLDWIDE



IVAN PANFILOV
*Commercial Director,
1st Deputy CEO*

Expansion on markets, both inside a country and beyond, is a prerequisite for development of a modern company. Presently, Izolyator sells 80% of its products in the markets of Russia and CIS countries and exports 20%.

TAKING RESPONSIBILITY

Izolyator has won trust with partners all over the world, proving its leadership in high-voltage bushings production, including bushings with solid RIP insulation. We work to strengthen partner relations with power grid and generating companies as well as transformer plants in Europe and Asia.

In the first quarter of 2018, we continued coordination with power grid companies and power equipment OEMs in Turkey, France, Belgium, Germany, China, India, Vietnam and our old and reliable partners in the CIS countries. It is worth mentioning that we are building a productive cooperation with Asian power grid companies and leading manufacturers of transformer and reactor equipment in that region. We are sending our products to the key power facilities of the state power grid company of India Power Grid Corporation of India Limited and Vietnam's state power grid corporation Vietnam Electricity EVN.

IZOLYATOR HAS WON TRUST WITH PARTNERS ALL OVER THE WORLD BY PROVING ITS LEADERSHIP IN PRODUCTION OF HIGH-VOLTAGE BUSHINGS, INCLUDING BUSHINGS WITH SOLID RIP INSULATION.

The leading positions rest responsibility on our company and we emphasize our openness to share the unique experience with all our partners, believing it to be part and parcel of our daily operations.

A YEAR OF IMPORTANT EVENTS

Traditionally, at the beginning of the year, we summarize results of our cooperation with partners and work on the annual plans. The report of our sales



Chairman of the Board of Directors at Izolyator Alexander Slavinsky and Member of the Board of Directors at Izolyator Alexander Sorokin at the sales division's report

OUR ACHIEVEMENTS HAVE STRENGTHENED IZOLYATOR POSITIONS AS A GLOBAL LEADER IN DEVELOPMENT AND MANUFACTURE OF A WIDE RANGE OF HIGH-VOLTAGE BUSHINGS WITH SOLID RIP INSULATION.



Technical Director Alexander Shornikov and Commercial Director Ivan Panfilov are listening to the report of Izolyator's sales representatives

division forms the basis for organization of a system, targeted and methodical work with partners and potential buyers of high-voltage bushings all over the world.

Sales executives in charge of Russian and foreign markets made reports about results of sales activities in 2017 to the company management including the Chairman of the Board of Directors Alexander Slavinsky.

The last year was the 10th Anniversary of the modern history of Izolyator plant in Pavlova Sloboda of Moscow region. It was marked by tremendously important events in both Russia and abroad. The overwhelming majority of sales goals was achieved, while some of sales directions outperformed the initial estimates.

The achievements strengthened Izolyator's positions as a global leader in development and manufacture of a wide range of high-voltage bushings with solid insulation.



Director of Strategic Sales at Izolyator Alexander Savinov is making a report on the results of sales activities in 2017

PROMISING COOPERATION

After the results were discussed, the management presented targets and objectives for the

2018, mainly concentrated on consistent development of partner relations in all sales division's activities.

The close-knit team of Izolyator uses every effort to achieve set targets as every staff member feels responsible for individual contribution to the common cause.

The purpose of operation and priority of development of every Izolyator's division is setting up long-term and mutually beneficial cooperation, success of our partners and consumers.

We appreciate partners and consumers for long-standing cooperation as well as support and openness to constructive dialogue and experience exchange in power industry.

OBJECTIVES OF IZOLYATOR ON THE GLOBAL MARKET:

- EXPERIENCE SHARING WITH LEADING POWER GRID COMPANIES;
- LONG-TERM COOPERATION WITH WORLD'S LEADING POWER GRID COMPANIES;
- LONG-TERM COOPERATION WITH LEADING GLOBAL POWER EQUIPMENT MANUFACTURERS;
- IZOLYATOR HIGH-VOLTAGE RIP AND RIN BUSHINGS PROMOTION ON THE GLOBAL POWER MARKET.



Report of sales division of Izolyator was a success!

OPEN RUSSIA — VIETNAM SEMINAR ON POWER INDUSTRY



Participants of the Russia — Vietnam seminar “Experience exchange in T&D — Presentations of Russian producers”

On 21 March 2018, Izolyator held an open seminar “Experience exchange in T&D — Presentations of Russian producers” together with leading Russian electrical engineering companies with representatives of Russian export center and Russian Federation Trade Mission in Vietnam.

THE KEY OBJECTIVES OF THE EVENT:

- development of integrative ties between the national and regional energy systems of Russia and Vietnam in the framework of Memorandum of comprehensive cooperation in power industry between the Federal grid company of Russia FGC UES and the state power grid company of Vietnam EVN NPT;
- expansion of international activities in the International Council on Large Electric systems (CIGRE), including invitation of new Russian and Vietnamese specialists to contribute to the activities of the Russian National Committee — RNC CIGRE;
- experience sharing between Russian and Vietnamese companies — manufacturers and operators of power equipment;
- best practice exchanges with Russia's leading power equipment manufacturers for modernization of power system of Vietnam;
- development of business contacts and formulating proposition to cooperation expansion between Russian and Vietnamese electrical engineering companies and power grids.

HISTORY OF COOPERATION DEVELOPMENT

Russia and Vietnam have traditionally maintained friendly relations and a close cooperation in all areas. In 2010, the countries signed an Inter-Government Agreement on cooperation in energy, which makes provisions for realization

of common projects in various sectors of fuel and energy complex, including power industry.

Development of the dialogue between power men and manufacturers of power equipment of Russia and Vietnam became another step in interstate partner relations.

Over several years, Izolyator has been initiator, organizer and participant of integrative processes that bring together experience and interests of power and industrial companies of Russia and Vietnam.

The natural development of relations between the countries in power industry led to the meeting of the Chairman of the Board of FGC UES PJSC Andrey Murov and the Chairman of the Board of the state power grid company of Vietnam EVN NPT Dang Phan Toung, which took place in October 2016 in Moscow.

The return visit of FGC UES management to Vietnam took place in August 2017. It ended with signing of the Memorandum of Understanding with EVN NPT for development of an all-round cooperation in power industry. The signing of memorandum became a major step towards development of the partnership between the leading power grid companies of Russia and Vietnam.

Another principal factor of cooperation development is that Russia is an active contributor to the International Council on Large Electric Systems CIGRE. The Chairman of the Board of FGC UES PJSC Andrey Murov is the leader of the Russian National Committee of CIGRE (RNC CIGRE) and Izolyator and a leading science and technology partner to RNC CIGRE in D1 sector research «Materials and Emerging Test Techniques». The Vietnamese colleagues are actively engaged in CIGRE activities, however there is no national committee formed yet. So, coordination in the CIGRE framework opens new opportunities for scientific and technical exchanges between specialists of the two countries.



SEMINAR PREPARATION

Beginning from December 2017, Izolyator together with Vietnamese and Russian partners has done a large organizational and technical preparatory work, which resulted in a business visit agenda for representatives of Russian industrial companies to Vietnam.



IVAN PANFILOV,
Commercial Director,
1 Deputy CEO,
Izolyator

«A series of Russia — Vietnam meetings, held in 2016 — 2017 with a common result of a fruitful cooperation set up between the power grid companies EVN NPT and FGC UES, has formed a firm foundation for the successful development of a large-scale cooperation between the companies and promotion of Russia's advanced power equipment technologies on the market of Vietnam. The open Russia — Vietnam workshop for Vietnamese specialists with participation of the leading Russian electrical engineering companies became a natural follow-up activity for sharing experience and bringing together interests of power and electrical engineering companies of the two countries».

The agenda included the following events:

- meeting with EVN NPT management;
- joint open workshop for specialists of Vietnamese companies;
- visit to EEMC transformer plant.

The Russian side was represented by leading manufacturers of power equipment: Izolyator, SVEL Group, Uncomtech Holding and VO Elektroapparat JSC.

Izolyator was represented by Ivan Panfilov, Commercial Director and Andrey Shornikov, Head of International Business Development.



ANDREY SHORNIKOV,
Head of International
Business Development,
Izolyator

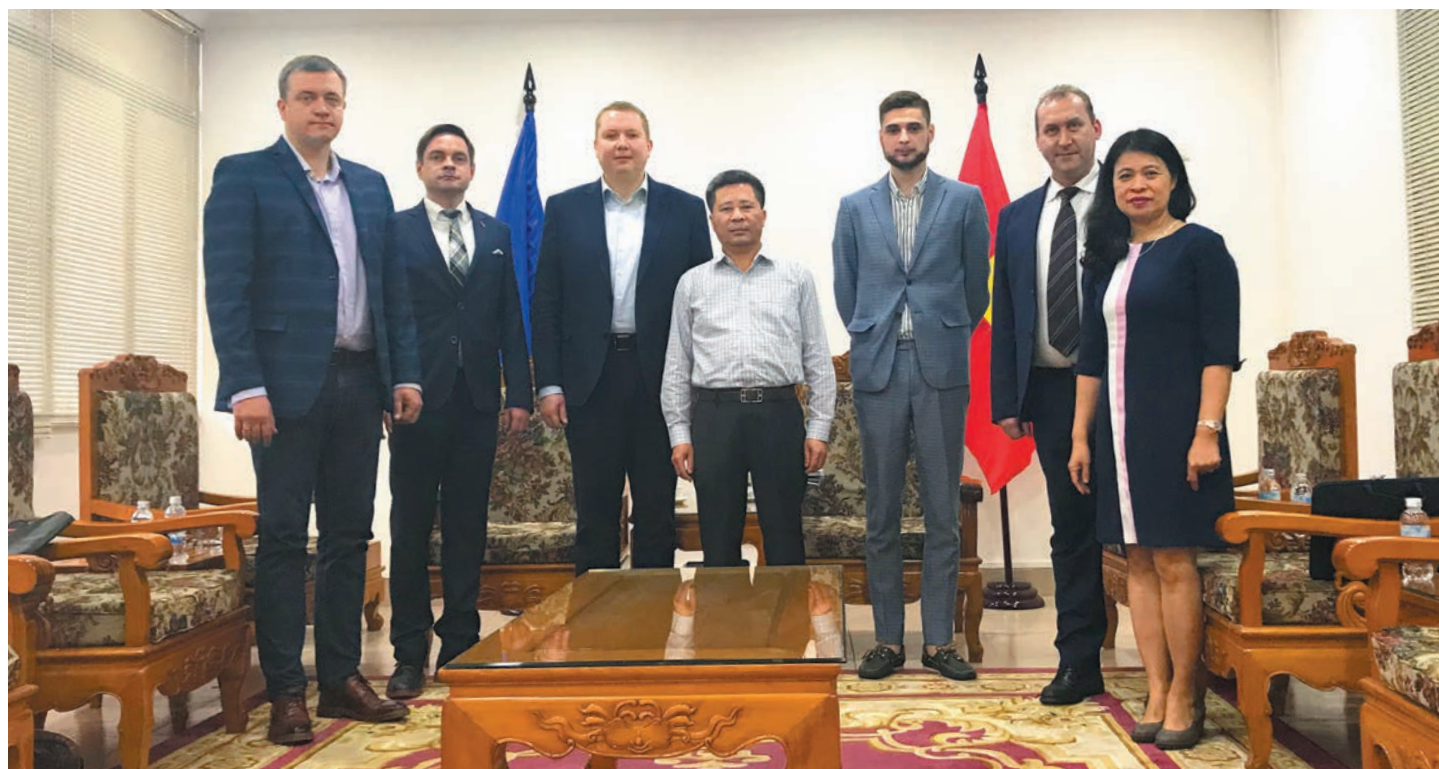
«Our joint activities with the leading electrical engineering plants of Russia in promotion of innovative domestic products to Asian and European markets allow us to set up constructive business ties with partners in various countries, participate in modernization of national power systems and position the Made-in-Russia brand on the global market».

MEETING WITH EVN NPT MANAGEMENT

On 20 March 2018, representatives of Russian electrical engineering companies were received by the Chairman of the Board of Directors of EVN NPT Dang Phan Tuong.

The meeting participants discussed the planned open seminar and informed about the key topics of Russian manufacturers' presentations.

On his side, Dang Phan Tuong spoke about the key trends on the power equipment market in Vietnam, mentioned the primary modernization tasks and development priorities of the power complex in Vietnam, and expressed interest in further cooperation development with Russian manufacturers of electrical products and the Federal Grid Company of the Unified Energy System.



The Chairman of the Board of Directors of EVN NPT Dang Phan Tuong is receiving representatives of Russian companies



The state power company of Vietnam EVN National Power Transmission Corporation (EVN NPT) was founded in 2008 as result of reorganization of activities of four transmission companies: Power Transmission Company No.1, 2, 3, 4 and three power project management offices - Northern, Central and Southern.



Public limited company Federal Grid Company of Unified Energy System (FGC UES PJSC) was founded in the result of power industry reform with the purpose of the national power grid management for its preservation and development.



Russian National Committee Association of International Council on Large Electric Systems (RNC CIGRE) occupies one of the leading positions within CIGRE both by number of members and advanced level of research in power industry ensured by the sustainable operation of the unique unified energy system of Russia.

OPENING OF SEMINAR

On 21 March 2018, an open seminar Experience Exchange in power transmission and distribution — electrical equipment in Russia took place.



Russian representatives are welcoming seminar participants



Registration of seminar participants

From the side of Vietnam, EVN NPT management and more than 100 professionals from generating, power grid and industrial companies and R&D specialists participated.



All is ready for the opening of the representative international event



Audience of the seminar

Alexander Kardo-Sysoev, Deputy Trade Representative of the Russian Federation in the Socialist Republic of Vietnam and Robert Kurilo, the Russian Export Center representative in Vietnam took part in the seminar.



ALEXANDER KARDO-SYSOEV,

Deputy Trade Representative of Russian Federation in the Socialist Republic of Vietnam

«The Russia — Vietnam cooperation is getting stronger on all levels. The trade turnover between our countries exceeded 5 bln USD last year, while the volume of bilateral investment reached 4 bln USD. Our government has set a target to increase Russia — Vietnam trade to 10 bln USD. This seminar falls in line with the concept of Russia — Vietnam relations development. It helps to strengthen business and economic ties between our countries».



Alexander Kardo-Sysoev, Deputy Trade Representative of the Russian Federation in the Socialist Republic of Vietnam is pronouncing a welcome address



ROBERT KURILO,
Russian Export Center Representative in Vietnam

«Power industry is a priority of Russian foreign activities in Vietnam. The Russian Export Center is prepared to render an all-round support to electrical companies of both countries in setting up a productive dialogue and promotion of highly advanced products to the market of Vietnam. When organized on such high level, such seminars work as indicators of a strong interest of Vietnamese manufacturers and power companies in modern Russian power equipment».



Welcome address of the Russian Export Center representative in Vietnam Robert Kurilo

WELCOME ADDRESS FROM EVN NPT

EVN NPT Vice-President Tran Quoc Lam addressed the audience with a welcome speech. He emphasized the huge importance of the event for the development of Russia — Vietnam relations in general and wish everyone a successful and productive work.



Welcome speech of EVN NPT Vice-President Tran Quoc Lam



Tran Quoc Lam emphasized the importance of the event for development of relations between the two countries

The workshop organizers prepared presentations, videos and other visual aids about Russian companies' activities in Vietnamese.



Ivan Panfilov is opening the seminar's business program

BUSINESS AGENDA OF SEMINAR

Ivan Panfilov, Commercial Director of Izolyator opened the seminar's business program. He made a broad overview of the power complex in Russia. He named the key factors and trends of power industry development by directions: generation, transmission and distribution. In his report, he also sounded production potential estimate as regards the output of the Russian electrical engineering companies that manufacture modern power equipment and, of course, passed to introduction of the leading Russian manufacturer of high-voltage bushings — Izolyator activities in detail.



Ivan Panfilov is introducing key facts and trends of power industry development to the audience

Andrey Shornikov, Head of International Business Development of Izolyator familiarized the guests with Izolyator product range, namely high-voltage bushings with solid RIP insulation, pointing out their advantages and giving arguments for the company's complete transition to the production of RIP bushings only.



Andrey Shornikov is familiarizing the audience with Izolyator innovative products



Andrey Shornikov paid a special attention to advantages of high-voltage bushings with solid RIP insulation

Presently, all the power grids of the world, including Russia and Vietnam, are mostly operating the bushings, which were made on the obsolete oil-in-paper insulation (OIP) technology, with their service life already significantly exceeded. In their reports, Ivan Panfilov and Andrey Shornikov summarized the practical experience of application and maintenance of OIP bushings in the power systems of various countries and gave an account of the international principles of risks evaluation in OIP bushings operation.

Taking into account the world's lengthiest outstretch of power lines, operated by the Federal Grid Company of Russia, and, consequently, the biggest park of high-voltage bushings of all rated voltages that operate in highly diverse climate condition, and also taking into account FGC UES's experience and other related factors, such as index of technical condition of bushings, the speakers presented the key principles of evaluation of further operation risks, types of scheduled measurements, need to additional diagnostics and principles of decision-making about OIP bushings replacement.

With its priceless, decade-long experience, Izolyator together with the Federal Grid Company are openly offering to use it with the purpose of ensuring a fault-free operation of the power complex of Vietnam. Also, based on the experience of Izolyator and FGC UES's transition to RIP technology exclusively, the speakers presented the key advantages, benefits and economic feasibility of a transition to high-voltage bushings with solid RIP insulation.

SUGGESTIONS ON COOPERATION DEVELOPMENT

The speakers pointed out the unique mass-use application experience of HV RIP bushings in Russia and especially on FGC UES facilities, with exempling on the parallel trend of transition to the RIP insulation worldwide on the instance of the leading global power grid companies.



The developing trend of transition to HV RIP bushings worldwide was mentioned in Izolyator representatives' reports

As an initiative to develop an open dialogue with EVN NPT further, Izolyator made a suggestion to develop and implement a project of independent evaluation of operated high-voltage bushings, operating on power facilities of Vietnam and assessment of reliability of the power equipment.

An independent expertise would offer an overview of condition of the entire park of installed high-voltage bushings of all types and voltages, currently used on the power infrastructure of EVN NPT. The condition, working efficiency and wear degree of the power equipment will be assessed in strict accordance with requirements of international standards and best practice.

In the result of that work, the service provider will present its findings of the risks for substation high-voltage equipment that use existing obsolete equipment and schedule timely replacements for prevention of possible dangerous and accidental situations on power facilities, form an emergency stock as well as other important for EVN NPT regulations.



Izolyator representatives' reports were received with interest and attention



Izolyator made a suggestion to develop a project to assess technical condition of high-voltage bushings and power equipment, operating in Vietnam

SEMINAR'S AGENDA CONTINUED

SVEL Group made a presentation of modern oil transformer, produced by the company.



ANTON TUGOLUKOV,
Deputy General
Director of SVEL
Group JSC

«One of the key topics of the seminar is studying a possibility of obsolete equipment replacement in the power system of Vietnam. The majority of questions from our partners to SVEL are concerned with SVEL's approach to solving the problem of electrodynamic withstand of our oil transformers. For the all-round evaluation of that problem, we seriously improved materials and technologies selection and perfected transformer design. So we are pleased to offer these solutions to our Vietnamese colleagues at this seminar, organized with support from Russian and Vietnamese power grid companies».



Anton Tugolukov, Deputy General Director at SVEL Group JSC is making a report



Dmitry Egorov, Deputy Export Director at Uncomtech Holding is at the rostrum

The presentation of Uncomtech Holding was dedicated to the innovative designs of uninsulated and insulated wires for aerial power lines.



DMITRY EGOROV,
Deputy Director
of Exports,
Uncomtech
Holding

«The most important objectives for the power industry of Vietnam are not only connected with a gradual replacement of 10 kV cable lines with oil-in-paper insulation by the cable lines with cross-linked polyethylene insulation, but also with maintenance of old operating oil-in-paper cable lines. Uncomtech plants make cables of both types, so this seminar is an excellent opportunity for promotion of our products on the market of Vietnam».

VO Electroapparat JSC presented its high-voltage gear for the companies of the industry.



ILYA ARSENIYEV,
Head of Sales,
VO Electroapparat
JSC

«In connection with the explosive development of Vietnam's power industry, the key topic of this meeting for us is delivery of high-voltage equipment for the reconstructed and greenfield facilities in Vietnam as well as replacement of the equipment, delivered in the 80s, by new one. We are pleased to see the high interest of our Vietnamese colleagues in the Russian equipment and believe such events to be a highly important groundwork for further cooperation».



The report of Ilya Arseniev, Head of Sales at VO Electroapparat JSC



SverdlovElektro Group (SVEL Group) is a leading power equipment manufacturer in Russia. The company boasts one of the impressive growth modernization rates in the industry.



Uncomtech Trading House, Public listed company Uncomtech Managing Company, Irkutskcable JSC and Kirsable JSC for a holding, engaged in production and sale of cabling products. The plants are among the largest cables and wires manufacturers of Russian Federation.



VO Electroapparat JSC is the largest manufacturer of high-voltage gear for 35–500 kV rated voltages for the power industry in the North West of Russia: thermal and hydro-electric power plants, large metallurgical and refining enterprises.

ON THE SIDELINES

During the coffee-break, participants shared impressions and vigorously discussed the received information.



Opinions exchange concerning the reports



Introductions and setting up of business contacts



Open dialogue at the seminar



Seminar participants are actively discussing presented materials



In the forefront - representatives of Russian companies, which participated in the seminar

CLOSING ADDRESS

In conclusion, Tran Quoc Lam summarized the workshop activities and thanked all the participants for the fruitful work, expressing hope for further development of the dialogue between Russian manufacturers of electrical equipment and Vietnamese power engineers.



Tran Quoc Lam is summarizing the work of the Russia – Vietnam seminar



Tran Quoc Lam is sharing hopes of active dialogue development between Russian and Vietnamese companies

The Russia — Vietnam seminar has marked a new stage in development of Russia — Vietnam economic relations: leading Russian manufacturers of power products, required for modernization and development of the power sector of Vietnam, are entering the market.

Izolyator will carry on with the open workshops practice to share experience between Russian manufacturers and Vietnamese power and industrial companies, information on innovative Russian power products including advantages of application and maintenance of high-voltage bushings with solid RIP insulation.

We appreciate the specialists and management of the state power grid company of Vietnam EVN NPT, the Russian companies: Uncomtech Trading House Ltd, SVEL Group and VO Electroapparat JSC as well as representatives of the Trade Mission of the Russian Federation in the Socialist Republic of Vietnam and the Russian Export Center for participation in the open workshop on experience sharing in transmission and distribution of electric power.



Representatives of the Russian companies are satisfied with the organization, execution and results of the event

GALA DINNER

At the end of the event, all participants were invited to the gala-dinner, where they continued to discuss cooperation in an informal atmosphere.



Seminar participants at the closing event of the day — gala dinner



Informal networking is an attribute of successful business cooperation

VISIT TO EEMC TRANSFORMER PLANT

Izolyator and SVEL Group representatives paid a business visit to have a meeting with the management of Dong Anh Electrical Equipment Corporation (EEMC) during their visit to Vietnam.

EEMC plant is an old business partner of Izolyator. The representatives of the two transformer plants made their acquaintance and proceeded to trilateral talks.

The sides discussed advantages of high-voltage bushings with solid RIP insulation and possibilities of completing EEMC power transformers with them. EEMC and SVEL Group shared experience. SVEL are successfully using Izolyator RIP bushings on their transformers.

The meeting was found very useful by all the participants, with the sides agreeing to develop further cooperation.



Talks of Izolyator and SVEL Group representatives with EEMC plant management



Participants of the meeting of Izolyator and SVEL Group representatives with EEMC plant management



Dong Anh Electrical Equipment Corporation (EEMC), founded on the basis of Dong Anh power equipment repair and maintenance plant, has years of tradition and experience of design, manufacture, supply and maintenance of electrical equipment for the national power sector.

RESULTS OF THE VISIT

The key results of the events that took place in Vietnam are:

- ✓ there is a strong interest, shown to Russian innovative designs and modern approaches to construction of power systems from the Vietnam side;
- ✓ the sides outlined directions of further cooperation and intensification of exchanges between EVN NPT and FGC UES;
- ✓ Izolyator is recognized and marked as initiators, organizer and active contributor to interactions between power companies and Made-in-Russia brand promotion on power markets of Vietnam and other countries;
- ✓ Izolyator sounded a suggestion about an independent assessment of high-voltage bushings that are in operation on power facilities of Vietnam and reliability of high-voltage equipment in order to schedule timely replacement and prevent possible dangerous and emergency situations on power facilities;
- ✓ Izolyator confirmed its readiness to arrange necessary meetings, seminar and discuss an possibility of a trial replacement of OIP with RIP bushings on the critical in terms of risks facilities of EVN NPT and announced about its preparedness to run a pilot project of RIP bushings installation on the transformer equipment of Dong Anh Equipment Corporation (EEMC).

ACKNOWLEDGEMENT

We appreciate all Russian and Vietnamese partners, who took part in the events, for their productive input and a large contribution in the strengthening and development of the Russia — Vietnam relations!

We would like to give our special thanks to EVN NPT and the Chairman of the Board of Director Dang Phan Tuong for cooperation and organization of the event on the highest international level.

Our special thanks for the all-round support in organization and execution of the seminar.

From the Vietnam side:

- **Mr. Tran Quoc Lam**, Vice-President, EVN NPT;
- **Mr. Nguyen Minh Thang**, Member of the Board of Director, EVN NPT;
- **Ms. Luong Lan Dung**, Director, International Relations, EVN NPT;
- **Ms. Thi Anh**, Assistant Director, International Relations, EVN NPT.

From the Russian side:

- **Alexander Kardo-Sysoev**, Deputy Trade Representative of Russian Federation in the Socialist Republic of Vietnam;
- **Rober Kurilo**, Head of Representation of the Russian Export Center JSC in Vietnam;
- **Anton Tugolukov**, Deputy General Director SVEL Group JSC;
- **Dmitry Egorov**, Deputy Export Director, Uncomtech Holding;
- **Ilya Arseniev**, Head of Sales, VO Electroapparat JSC.

PERPETUAL EXPANSION OF INTEGRATIVE TIES




ANDREY SHORNIKOV

Head of International Business Development dept.

Development of integrative ties between power and industrial companies of the world is getting a new meaning today. Izolyator is open to dialogue with partners all over the world and is actively expanding its international presence. At the same time, we carefully listen to the needs of those our partners, who are well familiar with the products of Izolyator plant.

MUTUAL INTEREST

 In the first quarter, Izolyator won a tender of the Indian state power grid company Power Grid Corporation of India Limited for delivery of 420 kV and 800 kV high-voltage bushings with solid RIP insulation. The bushings will have all relevant tests, including seismic withstand testing.

Cooperation with Indian electrical engineering and power grid companies is one of the most important activities and we are happy to carry on our regular practice of personal meetings. In March, Dmitry Orekhov, Foreign Trade Specialist and Victor Kiryukhin, Lead Technical Support Specialist visited several companies in India. The business agenda included talks with representatives of Transformers and Electricals Kerala Limited transformer plant, regional power grid company of Kerala Kerala State Electricity Board Ltd., Toshiba Transmission & Distribution Systems (India) Pvt. Ltd.

IN THE FIRST QUARTER, IZOLYATOR WON THE TENDER OF INDIAN STATE POWER GRID COMPANY POWER GRID CORPORATION OF INDIA LIMITED FOR DELIVERY OF **800 kV/ 2000 A** AND **420 kV/ 3000 A** HIGH-VOLTAGE BUSHINGS WITH SOLID RIP INSULATION.

WE PLAN TO RUN OPEN TESTS OF THESE TYPES OF BUSHINGS, INVITING OUR PARTNERS FROM ASIAN AND EUROPEAN COUNTRIES AT THE END OF THE YEAR!



High-voltage bushings seated on racks at the assembly shop at Izolyator plant

transformer plant and regional power company Telangana Transmission Corporation of Telangana Limited.

We appreciate the fact that the companies with some experience of cooperation with Izolyator plant are aiming at development of mutually ben-

eficial business relations and give much attention to planning cooperation and promising common projects. It is also pleasant that the specialists who first time learn about the advantages of RIP HV bushings made by Izolyator show a strong interest in our products.



The audience of Izolyator's presentation at KSEB, center - P. Vidjayakumari, Director, Transmission & Operation KSEB



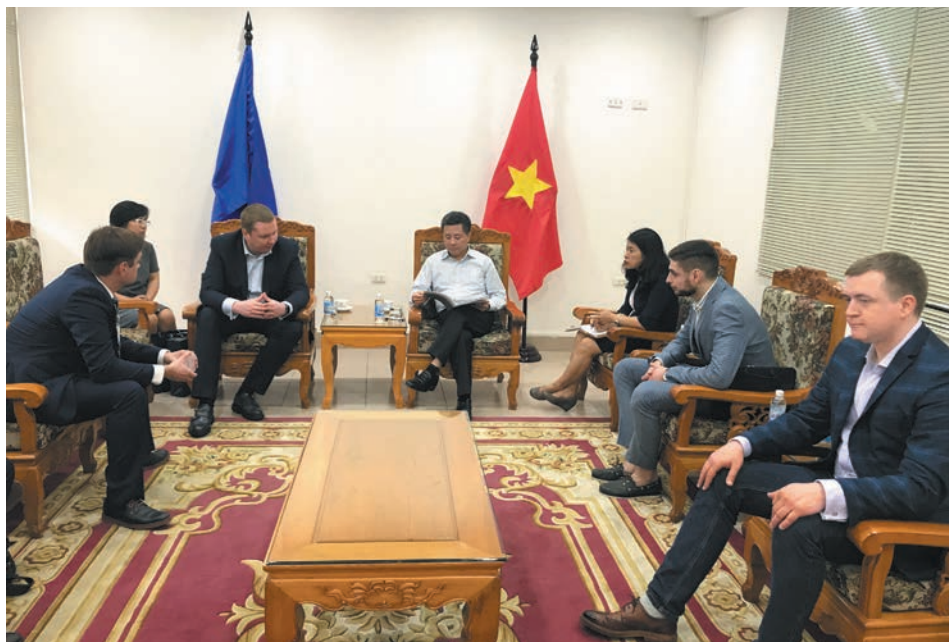
Transformers and Electricals Kerala Limited (TELK) has been instrumental in producing and setting up High Voltage equipment in the region. Initially, TELK carried out technical and financial collaboration between the Government of Kerala and Hitachi of Japan.



The Kerala State Electricity Board Limited (KSEB) is the successor entity of Kerala State Electricity Board which was constituted by the Government of Kerala for carrying out the business of Generation, Transmission and Distribution of electricity in the state of Kerala.




Shanghai Sieyuan High Voltage Switchgear Co. Ltd. is a manufacturer of power equipment and system solutions for switchgear. It owns several subsidiaries, including Jiangsu Rugao High Voltage Electric Apparatus Co., Ltd., which has an over 40 years history of research, development and manufacture of high-voltage distribution devices.



Chairman of the Board of Directors of EVN NPT Dang Phan Tuong is receiving representatives of Russian companies

DEVELOPMENT BASED ON SUCCESSFUL EXPERIENCE


 Our successful relations with power engineers of Vietnam can be a good example of productive cooperation. Over last several years, Izolyator initiated, organized and actively participated in integrative processes, uniting experience and interests of national energy and industrial companies of Russia and Vietnam, being a leader in promotion of Russian electrical products on the market of Vietnam.

At the open seminar in Vietnam, Izolyator suggested an independent assessment of high-voltage bushings that are in operation at power facilities of Vietnam and reliability of corresponding power equipment.

During the Soviet Union times, a great many of OIP high-voltage bushings were delivered to Vietnam, mainly as power transformer parts. Some of them were produced at Izolyator. Most of those bushings have exceeded 25 years in operation and assessment of the operation condition of existing equipment would allow to ensure a secure operation of the entire energy system of Vietnam. The assessment would take into account requirements of the international standards and experience of bushings operation by state power grid companies of other countries (FGC UES — Russia, PowerGrid India, Elia — Belgium, etc.).

IZOLYATOR IS OPEN TO DIALOGUE WITH PARTNERS ALL OVER THE WORLD AND ACTIVELY EXPANDS IN INTERNATIONAL OPERATION.

CONTINUING DIALOGUE

 Following the trend of entering large international markets, Izolyator is actively engaged in promotion of high-voltage bushings in China. Today, the company does not only bid in tenders, but also getting familiar with the capabilities of Chinese test laboratories.

In the first quarter, Izolyator representatives visited several electrical engineering companies and

R&D organizations in China, and held talks about deliveries of high-voltage bushings for the needs of Chinese state power companies and electrical engineering enterprises.

At the meetings, our representatives introduced specifics of manufacturing technology of Izolyator to management and specialists of Chinese companies and discussed deliveries of high-voltage bushings to the power market of China. Thus, Izolyator representatives met staff members of China XD Group plant, making 500 kV switchgear in Xian, and Shanghai Sieyuan High Voltage Switchgear Co., Ltd. in Shanghai, specialists of Powerchina Huadong Engineering Corporation Limited in Huadong, and also visited China XD Group company in Changzhou.

There was another productive visit to the Nantong Hyosung Transformer Co., Ltd. plant in Nantong. Izolyator representatives familiarized themselves with the company operations and had talks with the management and technical specialists on such issues as having seismic tests of high-voltage

bushings and participation of Izolyator in deliveries to the countries of Latin America.

In the second quarter, Izolyator specialists planned a series of meetings and seminars where we will speak about our advanced technologies in detail.

We appreciate our partners for joint activities and use every effort to make our relations highly efficient and mutually beneficial now and in future.



Visit of Izolyator representatives to Nantong Hyosung Transformer Co.

HYOSUNG

Nantong Hyosung Transformer Co., Ltd. is a power equipment manufacturer, such as power transformers up to 750 kV. The Korean company was founded in 1962 and in 2008 it opened a new plant in Nantong. The plant shipped more than 5800 transformers all over the world.

XD 中国西电集团公司 CHINA XD GROUP

China XD Group designs, tests and makes equipment for transmission, distribution and management of electric power. The group offers alternating and direct current power equipment for high, superhigh and ultrahigh voltages.

华东勘测设计研究院有限公司 HUADONG ENGINEERING CORPORATION LIMITED

Powerchina Huadong Engineering Corporation Limited is an international diversified engineering corporation. Presently, Powerchina Huadong employs over 4000 people most of whom are state engineers.

OPEN DIALOGUE IN ALL DIRECTIONS



YAROSLAV SEDOV
Head of Europe Sales

Perpetual development is one of Izolyator's principles. It not only concerns continuous improvement of created technologies, but also expansion

WITH DECADES OF APPLICATION AND MAINTENANCE EXPERIENCE OF OIP BUSHINGS IN ENERGY SYSTEMS OF DIFFERENT COUNTRIES, OUR COMPANY IS PREPARED TO SHARE WITH PARTNERS KEY INTERNATIONAL PRINCIPLES OF OPERATIONAL RISKS ASSESSMENT OF OIP BUSHINGS AND DEMONSTRATE ADVANTAGES OF HIGH-VOLTAGE BUSHINGS WITH SOLID RIP INSULATION

to new markets. At the same time, we aim at creating strong long-term relations with our partners worldwide.

STRENGTHENING CONTACT WITH PARTNERS

In the first quarter of 2018, our priority destinations were the countries of Middle East, Turkey and Saudi Arabia. These regions are of interest for us, looking attractive and promising due to their rapid development. We witnessed it once again at the meetings and talks. In March, Izolyator specialists visited Turkish electrical engineering companies.



We had a productive meeting with the management and specialists of Türkiye Elektrik İletim A.Ş. in Ankara. Together with Izolyator

representatives, their colleagues from Tempek Foreign Trade Co. Sezai Ozkaya and Safinaz Aybar participated in the meeting with TEİAŞ. At TEİAŞ, the guests were received by Mesut Yilmaz, Director, Materials Dpt and his colleagues. The talks began with a short presentation of Izolyator innovative products and proceeded with a discussion on possibility of Izolyator RIP bushings' application at power facilities of TEİAŞ.

Presently, Turkish power facilities are mostly using high-voltage bushings of obsolete design with oil-in-paper (OIP) insulation, with their service life already exceeding the maximum allowable one. With decades of application and maintenance experience of OIP bushings in energy systems of different countries our company is prepared to share with partners



Visit of Izolyator and Tempek Foreign Trade Co. to TEİAŞ Headquarter, 3rd on R: Mesut Yilmaz, Director of Procurement, Materials, TEİAŞ



Türkiye Elektrik İletim A.Ş. (TEİAŞ) is a Turkish state power grid company engaged in electricity transmission with construction of new power lines and development of the country's infrastructure using advanced technologies.



Tempek Foreign Trade Co. represents some of the well-known manufacturers from distribution & power transformer protection and measurement equipment in Turkey and in other countries as well. Tempek Foreign Trade Co. is a partner of Izolyator plant in Turkey.



visited Balıkesir Elektromekanik Sanayi Tesisleri A. S. (BEST) is a manufacturer of high quality distribution and power transformers. BEST is the largest national manufacturer in Turkey, with a reputation of reliable supplier in more than 50 countries.



Meeting with PSV representatives at Izolyator plant.
L-R: A.Vahedi, M.Nezam, Mr. Droodi, Andrey Shornikov and Dmitry Orekhov

key international principles of operational risks assessment of OIP bushings and demonstrate advantages of high-voltage bushings with solid RIP insulation.

TEIAŞ representatives showed a strong professional interest to the advantages and prospects of RIP bushings, and the sides agreed to more actively develop cooperation, sharing experience in the end.

The partners summarized results of the visit to Turkey at the meeting at Tempek Foreign Trade Co. in Istanbul. The sides discussed the key trends on the market of power equipment in Turkey and directions of further mutually beneficial cooperation development.

The warm welcome, given to Izolyator specialists by the Turkish side, was received with much appreciation. We are very glad to see common interest in development of long-term cooperation.



Visit of SAGIA representative Mr. Abdulrahman and RUSA Association staff members

AN OPPORTUNITY TO DEMONSTRATE OUR EQUIPMENT IN OPERATION, INTRODUCE OUR SPECIALISTS AND TALK ABOUT KEY PRINCIPLES IS WHAT HELPS US TO SHOW OUR PARTNERS OUR COMPLETE OPENNESS TO A DIRECT AND HONEST DIALOGUE.

In the second quarter, we plan to arrange a large seminar for Turkish partners, where we would be able to tell about the specifics and advantages of Izolyator plant products. Besides, we should mention that the first batch of Izolyator high-voltage bushings was shipped to the transformer plant

Balikesir Elektromekanik Sanayi Tesisleri A. S. (BEST) in Balikesir.

OPENNESS TO DIALOGUE

An opportunity to demonstrate our equipment in operation, introduce our specialists and talk about

key principles is what helps us to show our partners our complete openness to a direct and honest dialogue.

We are pleased to receive guests at our plant. In January, we had several meaningful visits happening. Representatives of the Iranian Fanavaran Pooya Sanat Vafa visited our plant. PSV was represented by A. Vahedi and M. Nezam and Mr. Droodi, PSV's partner was accompanying them. During their visit, we discussed results of cooperation between our companies and common projects for 2018. The meeting ended in exchange of advertising and promo materials.

We had a meeting, no less productive, with representatives of Saudi Arabian General Investment Authority Mr. Abdulrahman. Mr. Abdulrahman was accompanied by representatives of RUSA Business Partners Association for cooperation with the Kingdom of Saudi Arabia. The sides had talks about cooperation prospects, during which Mr. Abdulrahman gave a high opinion of the advanced production facility and po-

tential of Izolyator for doing business in Saudi Arabia.

In the second quarter, we plan to be more active in Eastern Europe and such countries as Serbia, Bosnia and Bulgaria specifically. Our experience has shown that demand in our products in those regions is really high. Besides, many countries used Soviet-made equipment, therefore their technical standards are similar to those we have in Russia.

We appreciate all our consumers and partners for having our meetings in a productive way, with a genuine interest to Izolyator products.



Fanavaran Pooya Sanat Vafa (PSV) provides industrial equipment, particularly equipment needed in the Iran power and electricity industry, providing engineering services for domestic manufacturers and educational services for their employees.



Saudi Arabian General Investment Authority (SAGIA) is an organization to effect control over investment activities in Saudi Arabia, including foreign investment. SAGIA as a regulatory authority and licensor attracts direct finance and technology investments.



RUSA Business Partners Association for cooperation with the Kingdom of Saudi Arabia is a non-commercial organization with voluntary membership, which unites legal entities and individuals to coordinate their entrepreneurial activities.

STRENGTHENING RELATIONS WITH CIS PARTNERS



MAXIM OSIPOV

Head of CIS Sales

Development of energy sector, its perfection and improving of reliability is a key activity of our company. Our team is proud to make a contribution to ensure an uninterrupted power supply to consumers of Russia and CIS. We keep sharing our experience and best technologies, creating a foundation for an efficient and long-term co-operation.

DEVELOPING COOPERATION



CIS is a special territory, since the member-countries are connected with many years of cooperation in power industry, among other, and today it is important to maintain and develop these relations. Over the last several years, our company has strengthened ties with power grid companies and power equipment manufacturers in Armenia, Moldavia, Tajikistan, Kazakhstan, Belarus, Ukraine, Uzbekistan and Georgia.

Last year, we also entered the Baltics market: Lithuania, Latvia and Estonia. In 2017, we sent a shipment of 750 kV bushings to Estonia. The customer was fully satisfied with the product and we expect to continue our cooperation with Estonian companies in 2018.

OUR COMPANY HAS STRENGTHENED RELATIONS WITH POWER GRID COMPANIES AND POWER EQUIPMENT MANUFACTURERS IN ARMENIA, MOLDAVIA, TAJIKISTAN, KAZAKHSTAN, BELARUS, UKRAINE, UZBEKISTAN AND GEORGIA.

Traditionally, we tell about our technologies and specifics of production to our guests. Thus, in February, Izolyator plant was receiving representatives of Chemtrade Estonia OÜ — Member of the Board Dmitry Nikulin and Purchasing manager Alexey Sadovsky. At our talks, we spoke about the successful results of co-

operation and outlined plans of further strengthening of long-term and mutually beneficial relations. During the plant tour, the visitors were able to personally witness Izolyator staff members' engagement in their work and get an introduction to the unique technologies of production and testing of high-voltage RIP bushings.



Talks at Izolyator: in the forefront — Alexander Slavinsky (L) and Member of the Board at Chemtrade Estonia Dmitry Nikulin



At the assembly shop of Izolyator plant, L-R: Maxim Osipov, Alexander Sadovsky, Purchasing manager at Chemtrade Estonia, Victor Kiryukhin and Dmitry Nikulin



Chemtrade Estonia OÜ is a business partner of Izolyator in Estonia. Over the long-standing fruitful cooperation, Chemtrade Estonia has proved a reliable and tremendously competent business partner of Izolyator plant on the power products market of Estonia.

JUST-IN-TIME DELIVERIES



One of the priority destinations for Izolyator products promotion is Belarusian power grid companies. Last year, Izolyator representatives, namely, Alexander Slavinsky, Chairman of the Board of Directors, Maxim Osipov, Head of CIS Sales and Dmitry Mashinistov, Head of SVN-Service visited SPA Belenergo where they told about the history of their company, geography of operations, design development and testing of our products. Also, in 2017, our company won the right to bid using fast-track procurement proceedings in RUP Minskenergo.

In the first quarter of 2018, we had the first direct delivery to the Republic of Belarus: 110 kV bushings under the agreement with RUP Minskenergo. We also won tenders for delivery of high-voltage bushings to the facilities of RUP Mogilevenergo and RUP



Teleconference at SPA Belenergo with Izolyator participation

WE VALUE AN OPPORTUNITY TO DEVELOP RELATIONS WITH OUR OLD PARTNERS!

Gomelenergo. We plan to carry on developing reliable and mutually beneficial relations with our partners in the CIS and we are always happy to tell about our achievements to potential partners.

STRONG PARTNERSHIP



We value an opportunity to develop relations with our old partners. In the first

quarter of 2018, we signed a new contract for supply of electrical equipment of Georgia.

We appreciate a lot our partner relations with Aetos Ltd Director Tamaz Sharikadze that we built over recent years. Based on our positive track record with Georgian State Electrosystem JSC, we are discussing a series of technical seminars at GSE company to introduce innovative designs and op-

eration of Izolyator high-voltage bushings. Among other plans for this year, there is an introduction of a detailed strategy to develop long-term business relations with the power industry companies of Georgia.

We appreciate our partners and consumers for an a comprehensive cooperation. Izolyator will keep the course to expand our partner network in the CIS and non-CIS countries. Our reliable, quality and competitive products secure our future success.



Photo courtesy RUP Minskenergo



JSC Georgian State Electrosystem (GSE) is a 100% state-owned joint stock company effecting transmission and transit of electric power all across Georgia and is an exclusive dispatch services licensee.



Aetos Ltd is an importer of electrical equipment of world's leading OEMs for the needs of power industry companies in Georgia.



State production association of electric power industry Belenergo (SPA Belenergo) organizes a reliable, secure and economically efficient operation and innovative development of production, transmission, distribution and sale of electric and thermal energy.

IN PERMANENT CONTACT WITH CONSUMERS



OLEG BAKULIN

Director of Partner Relations

The obligations that Izolytor undertakes we always fulfil just-in-time. This principle remains critical at all times and in 2018. In the first quarter, we shipped lots of high-voltage bushings to our Russian partners in time, including a large one to the power facilities of Moscow United Power Grid Company (MOESK PJSC).

MEETING THE HIGHEST REQUIREMENTS

We permanently work to improve technologies and try to supply the most reliable equipment to power engineers and consumers. The large and important work, that we always do with responsi-

bility — testing of high-voltage bushings — was carried out jointly with representatives of Balakovo NPP and VO Safety this time.

The acceptance tests of 220 and 500 kV bushings, made according to the requirements of the 3 class of safety of nuclear power plant equipment, intended for Balakovo NPP, went according to the test program and ended in success, proving that Izolytor products meet the highest requirements. It is important for us also because it is the first instance in the plant's history when our high-voltage bushings were made to meet the 3 class of safety of nuclear power plant equipment.

IT IS IMPORTANT FOR US THAT IT IS THE FIRST INSTANCE IN THE PLANT'S HISTORY WHEN OUR HIGH-VOLTAGE BUSHINGS WERE MADE TO MEET THE 3 CLASS OF SAFETY OF NUCLEAR POWER PLANT EQUIPMENT.



Participants of Izolytor bushings tests, made to meet the requirements of 3 class of safety of nuclear power plant equipment. L-R: Dmitry Ivanov, Oleg Bakulin, Team Leader Electric Shop, Balakovo NPP Sergey Zhukov, Representative of VO Safety Tatyana Golikina and Alexander Novikov



Balakovo NPP is the largest in Russia producer of electric power. 7 out of 8 safety and reliability indicators of Balakovo, which are measured using approach of the World Association of Nuclear Operators, are better than the worldwide average, comparing to other power units.



VO Safety public listed company realizes a mission of safe development of the nuclear energy and industrial sectors of Russia. VO Safety is engaged in activities aimed at ensuring nuclear, radiation, technological and ecologic safety embodying international principles of safety culture.



Interregional Distribution Grid Company of Ural Open Joint Stock Company (IDGC Ural JSC) is a uniform operator, effecting electric power transportation via 0,4–220 kV networks and providing grid connection services to consumers on the territory of Sverdlovsk, Chelyabinsk regions and Perm Kray.



Meeting at Chelyabenergo: Oleg Bakulin (L) and acting Chief Engineer at Chelyabenergo Sergey Godunov

ACTUAL AND PROSPECTIVE

We are in touch with our partners and prefer personal meetings. Our visit to the branch of Interregional Distribution Grid Company of

SPECIAL FOCUS TO DETAIL

We are glad to have meetings with partners and invite them to Izolyator plant. Thus, in January, General Director of Prim Techno Systems Ltd.

IN THE SECOND QUARTER, WE FACE IMPORTANT TASKS AND WE ACCEPT THAT RESPONSIBILITY, TURNING THE FOCUS OF OUR ATTENTION TO THEM.

Ural — Chelyabenergo early in February went in a productive atmosphere. At the talks with acting Chief Engineer Sergey Godunov and Head of Insulation and Surge protection Service Dmitry Prosvirnin we discussed advantages and specifics of operation of high-voltage RIP bushings as well as research development of Izolyator.

In February 2018, Chairman of the Board of Directors of Izolyator Alexander Slavinsky met with management of Tumenenergo JSC in Surgut. At the meeting with General Director Sergey Savchuk and First Deputy General Director, Chief Engineer Andrey Bragin the sides discussed prospects and key advantages of reequiptment of power facilities with high-voltage bushings with RIP insulation, successful cooperation experience and plans of long-term business relations development.

This kind of meetings help companies to create a solid foundation for further close cooperation.

Vladimir Pastushenko visited our company. At the talks, we discussed efficient directions, prospects and strategy of cooperation development.

In February, we received management representatives of Interregional Distribution Grid Company of Ural and its branch — Chelyabenergo.

The grid company and its branch were represented by First Deputy General Director, Chief Engineer of IDGC Ural JSC Vladimir Bolotin and acting Chief Engineer of Chelyabenergo Sergey Godunov.

Traditionally, during visits of our guest we do not only discuss working issues and cooperation prospects, but also organize a plant tour and pay special attention to demonstrating technology of production and testing of high-voltage RIP bushings.

In the second quarter, we face important tasks and we accept that responsibility, turning the focus of our attention to them. Prior to the summer maintenance program, we are to send shipments under contracts with Rosseti PJSC, Rosenergoatom Concern JSC, Balakovo NPP, branch of Rosenergoatom Concern in particular. Besides, Izolyator plant will manufacture bushings for the needs of Ust-Srednekamskaya HPP (part of RusHydro PJSC).

We appreciate our old partners whom we have fruitfully cooperated for a long time and potential partners whom we are only commencing to discuss attractive projects.



At Izolyator plant, L-R: Oleg Bakulin, acting Chief Engineer at Chelyabenergo Sergey Godunov, Alexander Slavinsky and acting First Deputy General Director, Chief Engineer at IDGC Ural JSC Vladimir Bolotin



Joint Stock Company for Energy and Electrification Tumenenergo (Tumenenergo JSC) is one of the largest interregional distribution grid companies in Russia. The service area of JSC Tyumenenergo is more than 1.4 million square kilometers and includes the Tyumen region, the Khanty-Mansiisk Autonomous Area — Ugra and Yamal-Nenets Autonomous Region.



Prime Techno Systems Ltd was established in 2006 by power industry automation specialists, making the sector one of priority markets of the company. Prime Techno Systems provides an entire range of services from design to commissioning of facilities on a turn-key basis.



Chelyabenergo — branch of IDGC Ural JSC — is engaged in electric power transmission via 0,4–110 kV power networks. The company ensures a secure operation and development of the distribution complex of Chelyabinsk region.

RELIABILITY IS A KEY WORD AT WORK



ALEXANDER SAVINOV
Director of Strategic Sales

IZOLYATOR SPECIALISTS BY RIGHT ARE PROUD TO MAKE THEIR CONTRIBUTION TO SECURING THE FAULT-FREE OPERATION OF ELECTRICAL EQUIPMENT AT POWER FACILITIES.

Setting up a productive long-term cooperation is an important component in our daily operations. Our team values an opportunity to make a contribution to power industry development in the country and the world, understanding that an instantaneous process. We closely interact with our business partners and all achievements that we make are result of large cooperative labor.

WITH CARE AND ATTENTION

In the first quarter of 2018, Izolyator was announced winner in the tender to sign a long-term agreement (3 years) for 35 - 750 kV bushings for the needs of FGC UES PJSC. High-voltage bushings from domestic manufacturer will ensure a higher security of power supply to consumers all across the country. FGC UES always pays special attention to reliability and it concerns both newly purchased equipment and operating units. The

high-voltage bushings, exceeding 30 years in operation, require regular checks because their materials (transformer oil/ insulating paper/ rubber goods / metal / porcelain) have limited life-time. This concerns bushings with obsolete type of internal oil-in-paper insulation (OIP) to a larger extent.

Taking into account that the high-voltage bushings with expired service life are referred to the equipment with higher wear level, application of the same diagnostic standards as for brand new bushings is evidently inadequate, because destructive processes in old bushings tend to develop drastically (avalanche-like). Monitoring characteristics of installed bushings should be done more carefully.

This problem finds understanding with Russian power engineers. Thus, Izolyator's specialists co-developed and implemented instructions on



Alexander Savinov (L) at the meeting table at Tatenergo JSC



Public limited company Federal Grid Company of Unified Energy System (FGC UES PJSC) was founded in the result of power industry reform with the purpose of the national power grid management for its preservation and development.



Joint Stock Company Tatenergo is one of the largest regional generating companies of the Russian Federation. The main activity of the company is electric and thermal power production at Tatenergo power plants, which enter the unified energy system, output of that energy to electric and heating systems.

diagnostics of 110–750 kV high-voltage bushings in R&D Center of FGC UES PJSC, thanks to which all high-voltage bushings with service life exceeding standard are to be put under a close control to allow timely identification of faults in their operation, which, consequently, decreases risks of emergency situations at power facilities of FGC UES PJSC.

EXCHANGE OF EXPERIENCE

We control fulfilment of all our agreements with partners. Thus, in January 2018, during our visit to Tatenergo JSC we spoke about details of common projects' realization as well as plans of cooperation development in nearest and mid-term ranges. Besides, these meetings are a great opportunity to tell about Izolyator's recent technical achievements and designs, including RIN bushings.

We had another productive meeting in Surgut, Tumen region, where Chairman of the Board of Directors of Izolyator Alexander Slavinsky met with the management of Main power lines of West Siberia. He was received by Alexey Maltsev, General Director of MES West Siberia, branch of FGC UES. The sides discussed technical trends in development and production of high-volt-



Alexander Slavinsky (L) and General Director of FGC UES PJSC's branch MES West Siberia Alexey Maltsev

age equipment, common goals and strategy of long-term cooperation as well as successful experience and measures to improve practical coordination.

DETAIL INFORMATION

Traditionally, technical seminars stand out in the row of events with our customers. In March, Izolyator held a seminar for the technical specialists of Quadra PJSC branch - Kursk generation. It was dedicated to the design features, technical characteristics, advantages and application prospects of Izolyator high-voltage bushings with solid RIP and RIN insulation as well as need for a special attention to OIP bushings, operating well beyond the limits of standard service life.

We are extremely pleased to see a genuine reaction and response from the audience, especially, when we talk about novelties, developed by the design office of Izolyator plant. We plan to familiarize professionals of power industry with the specifics of the solid RIN insulation further as it was created to have a higher moisture resistance of internal insulation of bushings with operation and storage in severe environment.

Ahead, we will face new projects and cooperate with power grid companies and electrical engineering companies of Russia. We will continue our work to timely deliver quality and reliable Izolyator products.

Kursk generation specialists showed a strong professional interest to the innovative designs of Izolyator, engaging in a productive dialogue with detail clarification on all issues regarding specifics and advantages of bushings with solid insulation as compared to their counterparts with other types of internal insulation, including reliability and maintainability.

TECHNICAL SEMINARS IS A WONDERFUL OPPORTUNITY TO TELL ABOUT RECENT ACHIEVEMENTS AND NEW DESIGNS OF IZOLYATOR INCLUDING HIGH-VOLTAGE RIN BUSHINGS.



Izolyator's seminar participants at Kursk generation



Main power lines of West Siberia (MES West Siberia) is a branch of FGC UES PJSC, which operates on the territory of the Ural Federal District. The service area of the company includes 3 subjects of Russian Federation with a population over 3.5 mln residents.



Kursk Generation is a branch of Quadra PJSC that provides thermal power to over 95% of Kursk residents, operating 1263 km of heating networks and serving 170 thnd individual accounts of consumers.

LONG-TERM COOPERATION AS A BASIS OF MUTUALLY BENEFICIAL RELATIONS



MAXIM ZAGREBIN
Head of OEM Sales

SPECIALLY FOR PMTT LDT OUR COMPANY HAS DESIGNED AND MADE HIGH-VOLTAGE BUSHINGS FOR TRANSFORMERS, INTENDED FOR KALININ NPP. THESE ARE THE FIRST PMTT TRANSFORMERS MADE FOR NUCLEAR POWER PLANTS, WHERE **750 kV RIP BUSHINGS** ARE USED.



A 750 kV Izolyator RIP bushing installation on a PMTT transformer intended for Kalinin NPP

Our company carries on innovative activities and is now implementing a more advanced, patented RIN insulation technology. In the first quarter, RIN bushings with planned shipment in the second quarter 2018 were already in production.

CONSTRUCTIVE DIALOGUE

We value an opportunity to express our gratitude to our partners. In the first quarter, it was possible due to an intensification of seasonal work with Russian and foreign transformer makers. During our meetings, we did not only present Izolyator plant, achievements of our company and new technologies such as RIN bushings, but also summarized our cooperation in 2017.

Summing up the results of 2017, we would like to mention our common activities with Togliatti Transformer Ltd and express our gratitude for the many years of mutually beneficial cooperation. Presently, Togliatti Transformer is one of the largest developers and manufacturers of electrical equipment in Russia and CIS. Over the whole 2017, we regularly maintained a constructive dia-



Joint visit to the transformer plant PMTT, L-R: Dpty Chief Designer at PMTT Ltd Alexander Yuzhakov, Dpty Head of Planning and Purchasing at FGC UES PJSC Konstantin Balikoev, Sales Director at VO Elektroapparat JSC Ivan Serebryakov, Head of Electrical Equipment Technology Development Dpt at FGC UES PJSC Kirill Lunin, Ivan Panfilov, Advisor to 1 Dpty Chairman of the Board of Directors at FGC UES PJSC Alexander Petrov, Director of Development and Corporate Affairs at PMTT Ltd Konstantin Stafeev and Head of Sales at PMTT Ltd Mikhail Melshin



Togliatti Transformer Limited is one of the largest designers and makers of electric engineering equipment in Russia and the CIS countries. The power equipment made in Togliatti securely operating in more than 50 countries of the world, including Eastern and Western Europe.



Power Machines - Toshiba. High-voltage Transformers Ltd is a joint venture of Power Machines and Toshiba Corporation. The project has developed since 2011, when the two companies signed a memorandum of cooperation and JV agreement, continued by construction of a plant to manufacture power transformers in Russia.

logue and met, organizing seminars for technical specialists.

BEST EXPERIENCE FOR FUTURE ACHIEVEMENTS

In March, we had talks with the management of Power Machines - Toshiba. High-voltage Transformers plant in Saint-Petersburg. The meetings was productive. As a result of the last year, the company received recognition as The most progressive partner of Izolyator in 2017.

We made another productive visit of management representatives from FGC UES, VO Electroaparat and Izolyator to PMTT plant. Konstantin Stafeev, Director of Development and Corporate Affairs, Alexander Yuzhakov, Deputy Chief Designer and Mikhail Melshin, Head of Sales received the guests. The sides made acquaintance with the production facility and had talks about realization of common projects.

WITH GRATITUDE FOR COOPERATION

We keep organizing open seminars for our partners. At the technical seminar, organized at Uralelectrotyazhmash plant in Ekaterinburg, we make a presentation «Design features, operation and installation of Izolyator bushings. RIN insulation: research, testing, prospects». UETM specialists re-



Participants in Izolyator's seminar at Uralelectrotyazhmash

ceived exhaustive answers to all questions, having marked the great use and convenience of this format of cooperation.

After the seminar, UETM's General Director Vladimir Kalauschenko received Izolyator representatives. The sides had technical and commercial talks, discussing progress of existing contracts and plans of further cooperation development. On behalf of Chairman of the Board of Directors of Izolyator Alexander Slavinsky, Uralelectrotyazh-

mash JSC received diploma «The most experienced partner of Izolyator in 2017».

One more seminar was held for the specialists of SVEL Group in Ekaterinburg in March. After the seminar, the side had commercial talks, with Boris Lesin, Chief Designer, Denis Guryev, Chief Designer 500 kV, Anastasia Kuznetsova, Head of Procurement, Danila Safin, Purchasing Manager and Elena Tishunova, Function Supervisor representing SVEL Group. From Izolyator, SVEL Group received a diploma «The most dynamically developing partner of Izolyator in 2017».

Last year, we also enjoyed a fruitful cooperation with Siemens transformers Ltd and we took the chance to congratulate the company on its 5th Anniversary. We are particularly pleased that all our meetings and seminars always go in the atmosphere of mutual interest.

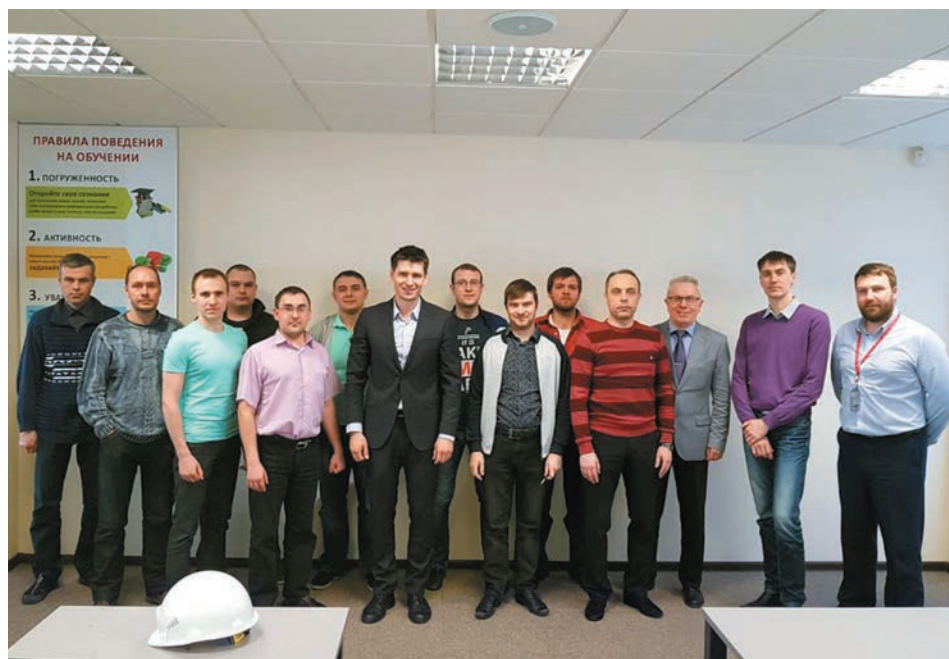
PERPETUAL INNOVATION

We are proud that our vision of development and strive to perfection find support with our partners. Today, we are actively preparing for new projects in 2018–2019. Thus, we pay special attention to cooperation with transformer makers in the CIS. Izolyator is very interested in exports of its bushings also as completing parts of transformer equipment.

Izolyator also continues production of 500 kV oil - SF6 gas bushings with the project of Rogun HPP. 220 kV bushings for another innovative Russian project are in production - we will tell about it in more detail next quarter.

We hope that the second quarter of 2018 will be even more productive, while we, on our side, will render our partners all-round support at all stages of our cooperation.

A LARGE SHARE IN OUR WORK IS SEMINARS FOR TECHNICAL SPECIALISTS OF TRANSFORMER PLANTS IN RUSSIA AND ABROAD.



Participants in Izolyator's seminar at SVEL Group



Uralelectrotyazhmash JSC (UETM JSC) is the biggest Russian developer and producer of electric power equipment for generation, transmission, distribution and consumption of energy. High-voltage equipment, transformers and reactors, converter equipment and electric machines of UETM brand are world known and enjoy a good reputation.



SVEL Group CJSC is a leading power equipment manufacturer in Russia. The company boasts one of the impressive growth modernization rates in the industry.



Siemens Transformers Ltd (Voronezh, Russia) is a 100% owned company of Siemens in Russia. Siemens Transformers Ltd plant project, its technology and equipment came as result of the long term experience in more than 20 transformer plants run by Siemens all over the world, including Germany and Austria.

CREATING COMMON SUCCESS



DMITRY ABBAKUMOV
Deputy Commercial Director

WHEN SOURCING NEW SUPPLIERS, ONE SHOULD HAVE A POSSIBILITY TO USE BEST PRACTICE OF COLLEAGUES. THERE EXISTS A TRUE POSSIBILITY TO SHARE REAL EXPERIENCE BETWEEN DIFFERENT COMPANIES OF THE MOSCOW REGION TODAY - CO-OP PORTAL OF INDUSTRIAL COMPANIES.

Consistent development of a company is impossible without adequate planning. Izolyator's sales division monitors the market, sources suppliers and engages in negotiation with existing and potential partners. Our experience shows that only long-term and mutually beneficial relations allow to timely procure completing parts and materials of proper quality for production.

ALWAYS IMPROVING QUALITY

In the first quarter, the commercial team made a business plan for 2018. As regards purchasing, we submitted orders for completing parts till the end of the year. We also plan to continue sourcing alternative suppliers of chemical products and winding materials. Besides, we see good opportunities in developing cooperation with non-ferrous

metals suppliers in order to make our work more efficient, having better delivery terms and higher quality of materials.

When sourcing new suppliers, one should have a possibility to use best practice of colleagues. There exists a true possibility to share real experience between different companies of the Moscow region today - co-op portal of industrial companies. In February, a meeting to discuss functionality and development of the web-portal dedicated to cooperation of industrial companies of the Moscow region was held in the Government House of the Moscow region, where we participated with great interest.

Management of systemic companies and small and mid-size business community representatives took part in the event.



Meeting dedicated to functioning and development of the Co-op Portal of Industrial companies of Moscow region




The web-portal dedicated to cooperation of industrial companies of the Moscow region is a free online platform for dealings between the region's companies. The portal is an internet service for industrial companies to use information about manufacturers, their product range and source a supplier or a buyer in the region.

The key topic of the working meeting was discussion of proposals on functionality improvement of the information resources, which was launched by the Moscow region Government last year. A lot of really useful information came up during the discussions, so we already working to use it efficiently for the needs of our company.

KEY TO EFFICIENT COOPERATIONS

We reach success due to close coordination with our business partners and regular personal meetings is a basis of such cooperation. In the first quarter, we received many guests at Izolyator plant. These meetings are remembered by efficient and successful talks.

 In February, representatives of the German BeA and Pakt Group visited Izolyator plant. BeA was represented by the CEO of BeA France Renard Benoit, the Pakt Group was represented by Dmitry Kolpakov, Sales Manager and Natalia Vatueva, HRM.

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Representatives of insulation components supplier Wacker Silicones visited Izolyator plant in March. Wacker Silicones was represented by Dr. Jens Lambrecht, Technical Manager (Rubber Solu-

AT THE TALKS, WE CLARIFIED AND AGREED ON REQUIREMENTS TO TECHNICAL CHARACTERISTICS AND PLANNED VOLUMES OF COMPLETING PARTS DELIVERIES.

tions, Engineering Silicones) and Mikhail Spirin, Sales Manager. The sides discussed progress on current deliveries of insulating compound components and aspects of cooperation between the two companies.

The partners also detailed expected deliveries to match the demands of Izolyator plant.

During the traditional plant tour, the guests were introduced to the unique technologies of

high-voltage bushings with solid insulation production. The hosts paid the most attention to demonstration of external polymer insulation making using Izolyator original technology.

We appreciate all our suppliers for active cooperation in the 1 quarter 2018 and are looking forward to further efficient partnership development!



Talks at Izolyator plant, L-R: Tatyana Sheina, Dmitry Abbakumov, Vladimir Romanov, Natalia Vatueva, HRM, Pakt, Dmitry Kolpakov, Sales Manager, Pakt and Renard Benoit, General Director of BeA France



Participants of business meeting at Izolyator plant, L-R: Antonina Maslennikova, Dmitry Abbakumov, Dr. Jens Lambrecht, Technical Manager, Wacker Silicones and Mikhail Spirin, Sales Manager, Wacker Silicones



Pakt Group is an exclusive distributor of the German BeA in Russian Federation. Pakt group supplies fastening hardware to Izolyator plant for production of packing of high-voltage bushings.



Wacker Silicones ranks among the world's largest manufacturers of silanes and silicones. Product portfolio ranges from silanes through silicone fluids, emulsions, elastomers, sealants and resins to pyrogenic silicas. Thanks to their highly diverse properties, silicones offer virtually unlimited potential for customized solutions in numerous sectors.

THE XV CONFERENCE "METHODS AND MEANS OF CONDITION CONTROL OF HIGH-VOLTAGE EQUIPMENT INSULATION"



Participants of the XV Conference "Methods and means of condition control of high-voltage equipment insulation" (photo courtesy Dimrus)

The key topic of the conference is Frequency-based methods of control of moisture content in solid insulation, scanning for deformation of transformer windings".

The focus of the scientific part was given to application of SFRA (Sweep frequency response analysis) method for identification of deformations and defects in transformers. D1 RNC CIGRE Materials and Emerging Test Techniques spoke at the conference:

V.K. Kozlov (Kazan State Energy University, co-speaker A.Kh. Sabitov) "The method and the device of measuring degree of paper insulation polymerization";

V.A. Rusov, PhD (Dimrus Ltd) "New designs of Dimrus";

I.V. Davidenko, PhD (Ural Federal University, co-speaker M.N. Vladimirova, Tyumenenergo JSC) "On development of technical guidelines for diagnostics of defects in oil-filled power equipment based on results of dissolved gases analysis".

The members of SC D1 RNC CIGRE also actively engaged in discussions of reports.

At the conference, Vladimir Ustinov, SC D1 RNC CIGRE coordinator and Deputy Quality Director at Izolyator worked at the sitting of the Council on Power Equipment Diagnostics.

On 16 February 2018, the conference agenda included trainings and practical exercises on:

- ultrasound defectoscopy;
- monitoring and diagnostics of transformers;
- online diagnostics of cable lines and

connecting sleeves;

- measuring of partial discharges in insulation;
- cable lines and 6-35 kV switchgear monitoring;
- vibration diagnostics of power equipment.

During the conference, the participants saw an exhibition of equipment by Incab plant and Dimrus and visited their manufacturing and office facilities.

Over 260 specialists from Russia, CIS and non-CIS countries took part in the conference from such places as Perm, Ekaterinburg, Novosibirsk, Moscow, Saint Petersburg, Kazan, Germany and Sweden.

We appreciate Dimrus Ltd for the invitation and conference organization on the highest level.



Dimrus Ltd develops, manufactures and implements a variety of modern diagnostic equipment, namely systems of stationary control. The company operates in more than 45 countries. Monitoring systems for main equipment control of power companies are also made by the company.

Cabex 2018



Alexander Slavinsky is speaking at the meeting of the Cabling products and materials workgroup during the Cabex 2018 Exhibition

On 21 March 2018, Alexander Slavinsky, Chairman of the Board of Directors, Chairman of SC D1 RNC CIGRE visited Cabex 2018 exhibition in Moscow and took part in the meeting of Cabling products and materials workgroup.

The meeting was dedicated to cable industry development roadmap with key directions of import substitution against existing problems in the sector.

In his speech, Alexander Slavinsky expressed his wish to take part in the workgroup's meetings on

a regular basis and made a presentation of interim results of cable fittings development, carried out by Izolyator plant: at the moment,

110 kV cable coupling sleeves have gone under testing, while 220 kV one are on the way.

The Cabling products and materials workgroup was organized early in 2017 in the framework of the multiagency coordination council on development of power machine building, electrical engineering and cable industry of Russia, which, in its turn, was set up by a joint order of the Ministry of Industry and Trade and the Ministry of Energy of Russian Federation.

The council aims at developing roadmaps, to be used for development of relevant directions and sectors, including schedules of activities and special measures of decreasing dependence on imported equipment and components.

We appreciate the organizers of Cabex 2018 for the execution of that event on a high professional level.

Our sincere thanks to the Cabling products and materials workgroup for the invitation and fruitful work!

Participation in the Business Breakfast of Corporation of Mid Ural Development

On 22 March 2018, Alexander Slavinsky, Chairman of the Board of Directors at Izolyator took part in a business breakfast dedicated to the Power equipment machine building in Russia, which was organized by Corporation of Mid Ural Development.

The event received support from Rosseti PJSC, the State Duma of the Russian Federation and the Ministry of Industry and Trade of the Russian Federation.

Representatives of legislative and executive branches of the government, Rosseti, generating companies and power equipment OEMs discussed experience of operation in import substitution conditions, changes in legislation and purchasing plans of the state as well as readiness of the market players to import decrease.

Russia's power industry is a large market place. Besides, Russian companies are building power infrastructure abroad, which enables them to use programs of state support for exporting equipment from Russia to other countries.

The order #653 of the Ministry of Industry and Trade determines decrease of imported 110-220 kV transformer share from 65% to 40%, switchgear – to 30% (from current 91%), high-voltage gear – from



Business breakfast dedicated to the Power equipment machine building in Russia and organized by Corporation of Mid Ural Development

30% to 10% by 2020. Also, 60% of electric transformers should be Russian-made by this time, containing less than 10% of imported components.

In the near time, Ministry of Industry and Trade will announce interim results of imports decrease since 2015 and Russian components share growth.

Depending on that information, the Ministry would plan further import substitution activities to reach to targeted indicators.

We appreciate Corporation of Mid Ural Development for the invitation, the topical event and an excellent organization.



Cabex is the only cabling and wiring products exhibition in Russia. There are leading global cable manufacturers, Russian suppliers of cabling and wiring products and wiring accessories and electric installation products suppliers among exhibitors.



Corporation of Mid Ural Development Joint Stock company is a specialized company, set up by the Government of the Sverdlovsk region, to assist realization of investment projects for business.

IMPORT SUBSTITUTION IN ACTION: OIL-SF6 HIGH-VOLTAGE BUSHINGS



KONSTANTIN SIPILKIN
R&D Director

In Innovation rubric, we continue to talk about the types, designs and operational features of Izolyator high-voltage bushings. Presently, there are over 360 items of equipment of various types and rated voltages in the range of our company. Among these products, there are transformer and reactor bushings, oil switch bushings and wall bushings. They differ by the type of connection (draw-lead type or bottom connection), by the type of external insulation (porcelain sheds of polymer insulation) and by the type of medium (transformer oil, air of SF6).

Notably, the type of the working medium may depend not only on the bushing design, but also on the volume and duration of required testing, both approval and acceptance tests at release of every bushing from the plant. Bushings for switchgear connection stand out in that row.

In this article, we would like to tell about application, design and testing of one of bushings that our plant designed as import substitution incentive to replace one of foreign-made counterparts, which did not fully manage to show itself from the best side.

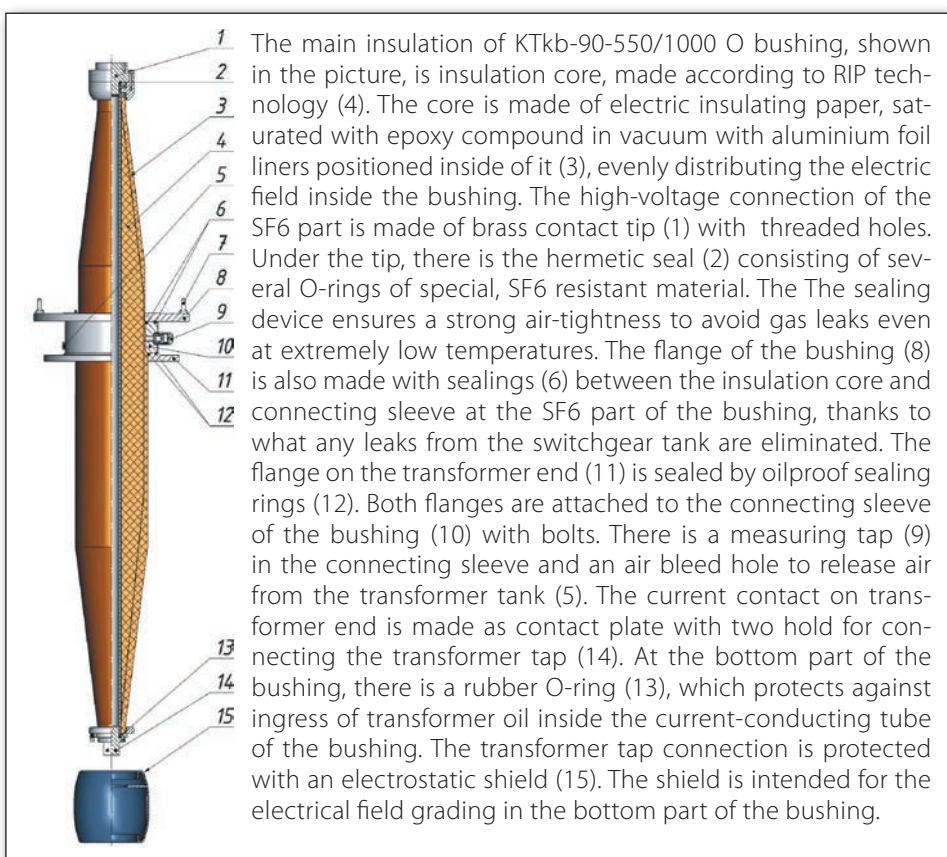
They use oil-SF6 bushings to connect transformers to distribution devices with SF6 insulation, which are an independent structural element, whose quality and reliability directly influence intactness and operational capability of the power unit.

Connection of power transformers (reactors) to distribution devices with SF6 insulation is done with the help of oil-SF6 transformer bushings. Switchgears are connected to cable lines with the help of cable bushings.

With the seemingly simple construction, an oil-SF6 type bushing performs a totality of important functions. On the one hand, it has a function of pass-through insulator, so, in this respect, all requirements as to any other bushing will be relevant. These requirements are stipulated by IEC 60137-2017 (bushings, insulated for alternating voltages above 1000 V). On the other hand, a transformer oil-SF6 bushings carries the function of mechanical joining of two enclosed power objects, one of which uses SF6 as the main insulating medium, the other — transformer oil. These aspects form several special requirements, which are listed in corresponding IEC 62271-211 standard (direct connection of power transformers and distribution devices with SF6 insulation in metal casing with nominal voltage above 52 kV). As known, SF6 is free flowing, so when designing transformer bushings for switchgear systems, a special attention should be paid to air-tightness. The bushing has to withstand testing for gas impermeability, air-tightness and external pressure test, detailed

in IEC 62271-211. To ensure a good air-tightness they increase number of sealing gaskets or rings in locations with possibility of SF6 leakage. The material, chosen for sealing, also matters. The most recognized in the world sealing for SF6 connections is EPDM (ethylene-propylene-diene monomer) rubber. The flute-grinding for the sealing must have sufficient roughness, while machine direction has to be transverse to the direction of SF6 ingress. Sometimes, the bushing would be equipped with a sensor, which signals leakage on the «first» sealing. It helps the maintenance staff to eliminate the problem in sufficient time in advance before the «second» sealing fails. These strict requirements and safety measures are conditioned by possible grave damagees (electrical breakdown, thermal breakdown, arc development and explosion hazard) at depressurization of the bushing or the SF6 tank.

The specifics of operation of a oil-SF6 bushing is that a switchgear is fixed on the flange of the bushing, therefore on top of the maximum working pressure of gas the mass load of the switchgear itself is added. In connection with that, the flange has to meet very strict requirements to mechanical strength. Mechanical effort, applied to the matching joint should cor-





Preparation of a 500 kV oil-SF6 bushing for testing at Izolyator plant

KTkb-90-550/1000 O BUSHING SUCCESSFULLY PASSED THE WHOLE ACCEPTANCE TESTS PROCEDURE AND WAS APPROVED FOR SERIAL PRODUCTION.

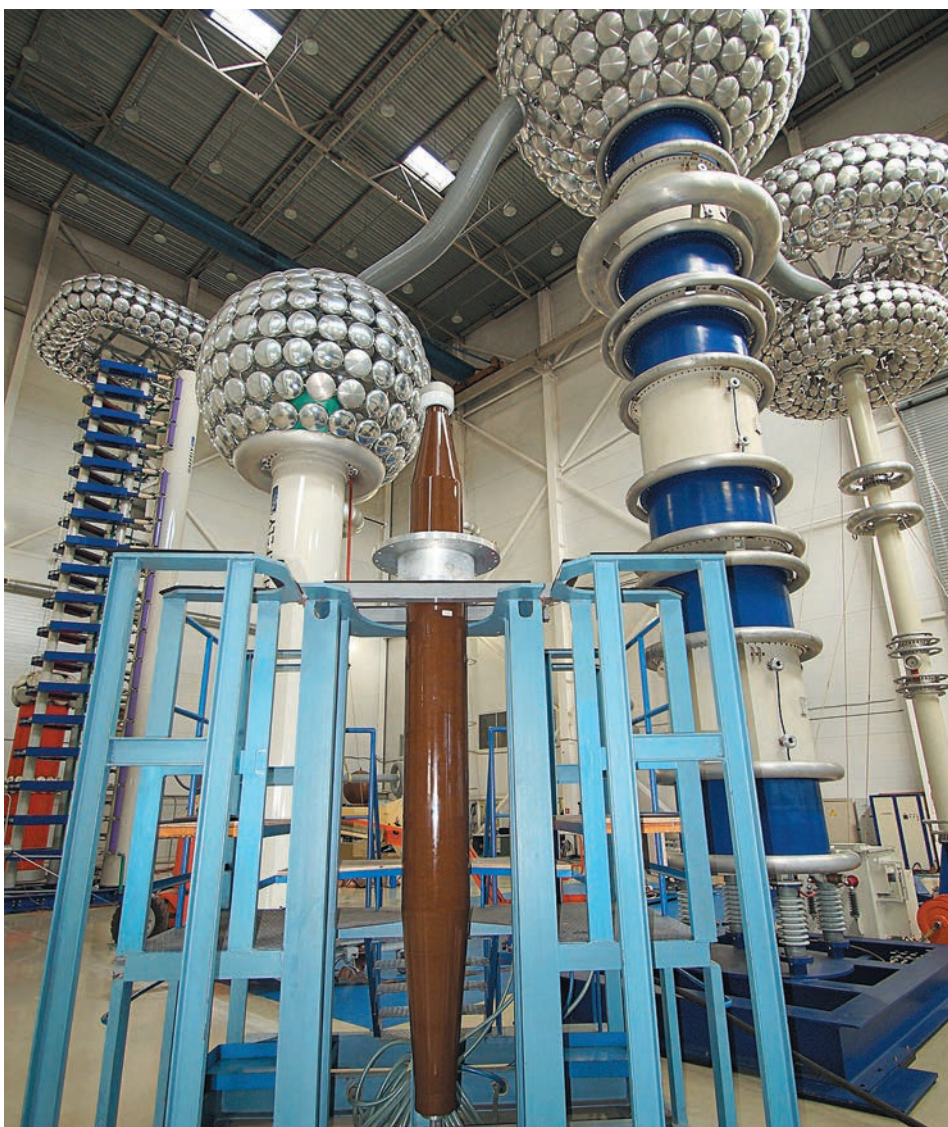
respond to IEC62271-211. In order to test the coupling sleeve joint for mechanical strength, they put a composite cap on the top flange. The probatory moment of 40 000 Nm, which has to be applied to the upper part of the sleeve, is achieved by applying a 6000 N cantilever load to the top side of the composite cap. The exposure time is 1 minute.

The bushing also passed external pressure test. A testing tank was mounted on the top of the bushing after the tanking to 1.15 MPa the bushing spent 1 min under pressure. After the external pressure test, an air-tightness check was done from the end of the SF6 gas distribution device. A testing tank was mounted on the upper part of the bushing. It was filled with SF6 to reach 0.75 MPa. After that they performed a check for possible leaks of the gas with a leakage tester. When performing electric tests, they put a metal casing on the top part (SF6 filled) of the bushing, on top of which a temporary bushing was set. This construct provides a possibility of feeding voltage in operating environment. Despite all the difficulties that arise the KTkb-90-550/1000 O bushing successfully passed the whole acceptance tests procedure and was approved for serial production.

For connection of power transformers with switchgear, bushings with oil-in-paper insulation were used. They have several weaknesses and disadvantages. It makes little sense to talk about them in this article, as there is not so much new to say. RIP bushings can be completely dry — that seriously simplifies sealing. On top of it, there is no need to install the porcelain shed — the bushing mass is dramatically decreased just as load on the flanges. Among other advantages, RIP bushings have a good

mechanical strength and are cheaper in maintenance. RIN bushings came up recently. They can be completely dry, too. This type of insulation is made by series winding on a tube made of synthetic non-woven material, vacuum degassing and saturation with compound. The distinctive feature of this insulation is very low dielectric loss values, low level of partial discharge and absolute moisture resistance compared to RIP insulation. There is no experience of connecting RIN bushings to switchgear yet, however we can expect that RIN bushings, with all their advantages, will soon be used for switchgear connection. As of now, RIP bushings remain a choice of preference for connecting switchgear to transformer.

500 kV oil-SF6 bushings are already in serial production and are delivered to MES Center. At the moment, Izolyator is making a lot of KTkb-90-550/1000 O oil — SF6 bushings under the order of Togliatti Transformer, intended for Rogun HPP, Republic of Tajikistan. We hope that the bushings of our production will perform better than their foreign-made counterparts, which they were designed to replace.



500 kV oil-SF6 after successful testing

OUR CORPORATE LIFE

Alexander Slavinsky awarded a medal of Merit for Electrical Engineering



AES RF President Pavel Butyrin is handing the Medal of Merit for Electrical Engineering to Alexander Slavinsky

On 20 February 2018, Chairman of the Board of Directors of Izolyator Alexander Slavinsky,

EngD was awarded a Medal of Merit for Electrical Engineering named after A.K. Antonov.

Medal of Merit for Electrical Engineering named after A.K. Antonov is awarded to the scientists and leaders of research institutions and production companies from electrical engineering, power industry, electronics, electrical machinery, electric drives and other fields and disciplines, who made a prominent input in establishment and development of electrical science and technology.

The medal is also awarded for publications, textbooks on relevant electrical disciplines and creation of new equipment prototypes.

Presidium of the Academy of Electrical Sciences of Russian Federation (AES RF) makes decisions on the nominees presented by the sector and regional divisions of AES RF and members of presidium by an open voting.

Alexander Slavinsky was awarded this medal following the decision of AES Presidium of 14 February 2018.

The awarding ceremony was held on 20 February as official part of the AES RF meeting, following the scientific panel "Current issues of electrical engineering", dedicated to the 25th Anniversary of the academy.

Izolyator staff is congratulating Alexander Slavinsky with the just reward and recognition!



Pavel Butyrin is speaking about the 25th Anniversary of AES RF

Visit of Agency of Quality Supervision Experts



Experts of Agency of Quality Supervision at Izolyator plant, L-R: Alexander Sharikov, Anatoly Balykin, Yury Nikitin, Vladimir Ustinov, Tatyana Vasina and Alexander Novikov

On 30 March 2018, representatives of Agency of Quality Supervision visited Izolyator plant.

Agency of Quality Supervision Closed Joint Stock Company (QSA JSC) monitors quality under Russia's standards in ecology, technology and nuclear power.

Anatoly Balykin, Chief Expert and Alexander Sharikov, Lead Expert represented Agency of Quality Supervision, electrical equipment department.

The experts were received by:

- Alexander Novikov, Quality Director,
- Vladimir Ustinov, Deputy Quality Director,
- Yury Nikitin, Chief Designer,
- Tatyana Vasina, Head of Quality Bureau.

The sides discussed realization of corrective measures in Izolyator quality management system to certify the plant as supplier of high-voltage bushings for nuclear power plants.

The experts marked substantial progress in that transition.

Quality gets our constant attention

On 27 February 2018, Izolyator held a meeting to evaluate performance of the integrated quality, ecology, health and labor protection system in 2017.

The meeting on integrated quality, ecology, health and labor protection management system (IMS) is a production meeting at Izolyator where issues of quality, results of quality improvement incentives and IMS performance are discussed, IMS and quality improvement incentives are introduced. The meeting is also called to develop corrective and preventive measures, formulate policies of a more efficient ecological management as well as health and labor protection.

There is a specially approved Izolyator corporate policy for IMS meetings preparation and protocol.

Izolyator management and all functional leaders took part in the meeting.

Quality Director Alexander Novikov made a report about performance of the quality assurance program in 2017.

The colleagues summarized the general quality indicators of the company operation and IMS performance in 2017, outlining measures of further IMS development in 2018.



The meeting to evaluate performance of the integrated quality, ecology, health and labor protection system in 2017 at Izolyator

PEOPLE IS OUR KEY VALUE



SERGEY MOISEEV
General Director

Human resources development in any company is a long-term objective, which is structured and achieved through creation of a talent pool by efficient development of young staff members, realization of their potential, training and development of the existing team. Besides, the permanent improvement of the organization structure to bring it in coincidence with the dynamics of changes of both external and internal conditions always receives our attention. We pay special attention to motivating staff members to maintain a healthy lifestyle, including sports activities, as well creation of favourable working conditions and a working system of life and health protection at the plant. These activities are a subject of constant care of our company management in all levels.

GIVE WAY TO THE YOUTH

In order to ensure succession in company management, increase the company staff's preparedness to changing conditions of today, transfer knowledge and skills from experienced veterans to young specialists and develop professional and managerial competences with staff members, the company launched a diversified talent pool development program in 2017. The program includes several stages of talent pool creation among young managers and specialists of the company for specific positions and their attachment to corresponding mentors, training of the succession candidates and their mentors according to various programs and in training formats as well as practice in available managerial positions.

There are more than forty succession candidates and twenty mentors participating in the talent pool development program today.

Such training programs as personal growth programs, development of managerial competences in negotiation, staff management, motivation and coaching, efficient time management, stress management and modulation of emotions,

public speaking and making presentations find great interest with the trainees. The training is performed by well-known speakers and business trainers.

Beside the above mentioned programs, we monitor the needs to arrange additional training, offering other relevant topics that we identify when analyzing performance.

SPEAKING ONE LANGUAGE WITH PROFESSIONALS

At the end of 2017, our company entered a new stage of professional training program, embracing over forty staff members of various qualifications and occupations.

The focus in development of knowledge and skills with the company staff is distributed into a number of fields. Firstly, we need to improve the basic level of company team in electrical engineering, personal competences, cross functional thinking, managerial mindset and psychology through introduction of analytical approach in decision making and personal responsibility for their fulfilment, upgrading of legal, accounting and commercial specifics awareness, learning contemporary methods and technologies of commercial activities. Secondly, our trainees should receive actual and highly professional information about the modern technological and technical conditions of the products manufacture at our company and the entire power industry.

Thirdly, we need to form professional skills and develop required competences with the talent pool.

To perform the training in company management topics, the company attracts leading



Project of talent pool development at Izolyator, presented by Julia Tyurina, Human Resources Manager (fourth on L)



Professional training of Izolyator staff members in management

THE PROFESSIONAL TRAINING OF OUR COMPANY STAFF MEMBERS IS NOT A ONE-OFF EVENT, BUT IS RATHER VIEWED BY OUR MANAGEMENT AS A SYSTEM PROCESS OF CHANGING MENTALITY AND BEHAVIOR STYLES OF TEAM MEMBERS BY TRANSFER OF NEW KNOWLEDGE, SKILL AND EXPERIENCE FROM THE LEADING MANAGERS AND SPECIALISTS OF THE COMPANY.

managers and specialists of our company, professional business trainers and staff professors of the Federal state budgetary educational institution Moscow Power Engineering Institute.

There is a good example such an initiative: the foreign trade department specialists perfected their communicative skills for the first time under the leadership of experienced business trainers, with several foreign experts, speaking native English, among them.

Importantly, the trainings are performed by the people, aware of business development specifics in the countries that are existing or potential consumers of our company products all over the world. These trainings with native speakers have proved effective: the training sessions are successful and productive and have a traditionally high level of interest from the team. Izolyator staff members are to complete mastering new skills in management by the end of the 2nd quarter of 2018.

The multistage training process at the company is organized and managed by the human resources department, led by a highly professional manager Julia Tyurina. Thanks to her knowledge and experience she was able to organize the process, based on the assessment of company demands in the staff, possessing needed qualification. These demands find response in creation of targeted programs, search and invitation of professional trainers and tutors, conclusion of training agreements and controlling the training process performance.

It is important to collect from trainers and mentors their individual opinion and assessment

of every trainee for an efficient use of collected information for staff decision making.

We continue to recommend our best staff members for a decoration, be it a corporate or industry and regional award. Thus, to mark the 10th Anniversary of Izolyator plant in Pavlova Sloboda, about 100 team members of our company were awarded Letters of recognition, Thank-you letters and corporate awards, with 10 persons receiving Thank you letters from the Governor of the Moscow region.

SAFETY GOES FIRST

Among the most potent measures to take care of the company staff is to ensure safety and comfort of staff members and guests of our company, when they are situated in company and plant premises. As we say, safety goes first, and within the whole spectre of safety issues, fire safety ranks highest. We closely monitor conformity to normative legislation that regulates security of facilities in respect of fire danger.

In 2017, we organized the work of our responsible specialists in close cooperation with the fire inspection and local office of the Ministry of emergency situations of Istra region under direction of Ilya Vishnyakov, Head of Internal services dpt. The specialists of inspection body performed scheduled methodological and informational support at all our events, which ena-



Chief of Mechanical shop of Izolyator Mikhail Sheremetyev is awarded a thank-you letter from the Governor of Moscow region



Practical fire safety exercise is organized and run by Boris Sobelman, HSE Manager at Izolyator

bled us to improve and develop the system of fire safety at our company.

The staff and our technical divisions in particular, led by Chief Engineer Andrey Kozlov, successfully completed tasks in the following fields:

- improvement of the existing automatic fire alarm system and connected devices - 54 additional units to control ventilation system and smoke indicators were installed;

- fire safety training organization for staff members, teaching them practical fire fighting skills. The exercises were organized according to relevant instructions of the Ministry of emergency situation. 100% of staff were involved in practical exercises with participation of the local fire fighting team: staff members extinguished fire outbreaks under the control of EMERCOM representatives at the drills;
- ensuring a sustainable control over the condition of engineering and technical communications at company premises, influencing fire safety - additional smoke indicators and alarms are installed in locations of technical systems and mechanisms, which operate in 24/7 mode as required by the production process. Thus, we ensured an appropriate reaction time to various malfunctions in systems and mechanisms with lengthy periods of operation potentially causing fire dangers;
- significantly improved technical capabilities in extinguishing fire outbreaks - with additional works done to have additional water tanks installed and connected and high-pressure water pumps connected to the fire piping network, and 50 fire hoses replaced in the system of internal fire mains. company facilities safety, - altogether they reflect cooperation of

our specialists, ensuring timely identification and, at times, forecasting of possible breaches in fire safety policy, consequently ensuring advanced protection of the company and staff.

The systematic control of premises in respect of fire dangers, development and realization of corrective measures, increasing company facilities safety, - altogether they reflect cooperation of our specialists, ensuring timely identification

HAVING RUN AN ANALYSIS OF ALL PREVIOUS ACTIVITIES OF OUR COMPANY ACROSS DIFFERENT ASPECTS OF SECURE AND SAFE OPERATION AND ACTIVITIES OF PEOPLE IN ITS PREMISES, WE CAME TO UNDERSTANDING OF NECESSITY OF A COMPLEX APPROACH TO ENSURING SAFETY AT THE PLANT.

and, at times, forecasting of possible breaches in fire safety policy, consequently ensuring advanced protection of the company and staff.

In the first quarter of this year, in order to improve sustainability of management and ensure a higher level of fire safety measures, the company management made a decision of restructurization and creation of a new division, accumulating under its responsibility the whole range of functions in security and safety.

We speak about the health and safety department, which was headed by an experienced specialist who was in charge of fire safety issues at our company - Boris Sobelman.

The department is created from existing specialists of the company, specialized in various directions. The team will concentrate on performance of such tasks as organization and control

of quality of civil defense events, damage control and rectification of the consequences of accidents and fire safety, organization of interaction with a private security company and control of its performance under the corresponding agreement, planning and running activities in labor protection, ensuring ecological safety.

The department already distributed tasks and responsibilities among its team. The head of the department approved an instruction that the team members will be governed by it when performing their duties.

The department has actively engaged in execution of training activities by completing the third and final stage of specialized assessment of labor conditions. In the result of this procedure, over a hundred of working stations at the plant will receive attestation.

DAILY CARE ABOUT STAFF

This year, just as in 2017, we will continue to maintain our social policies in respect to the daily activities of staff members. For example, despite of the next increase of the cost of the business lunch at the plant canteen, the company has covered the difference in cost, increasing the subsidy of meal allowance, keeping the cost to employee unchanged for over 10 years now in the amount of 50 rubles!

Also, early in 2018, the company ran another annual indexation of the partial compensation for traveling to work and back using private vehicles. Presently, it makes an amount over 200 rubles per day in office.

Those employees who do not use private transportation option, are offered to use leased corporate transport. In 2018, Elena Mazova, Chief of transport shop analyzed this issue and agreed

with the company management replacement of the transport company, signing an agreement with a provider offering a better service corporate passengers transportation. By doing this, we aim at creating more comfortable conditions for our staff members when traveling to work and back. This, of course, should in its turn lead to decrease of possible sickness cases of our colleagues, especially in cold winter and hot summer periods of the year.

To continue the healthcare topic, in 2017, our Medical Officer Svetlana Yalymova organized an annual medical examination for the company staff on the basis of Istra based medical center Paratsels to ensure an adequate standard of labor conditions. Chief Doctor of the center Tatiana Baskakova was very helpful in organizing the examination.



All the teams of the first games of the open Izolyator futsal tournament among staff members for Izolyator 2018 Spring Cup

SPORT IS LIFE

Early in 2018, we completed the first stage of equipping the multi-gym of our company. The whole idea is a practical step to lead propaganda of healthy lifestyle, after realization of #15 Federal Law «On health protection of citizens from impact of tobacco smoke and consequences of tobacco consumption» and ban on smoking inside premises and on the territory of the company (this actually took effect with some of our workers to quitting smoking). In February, the hall for team sports opened its doors and became immediately demanded by amateurs of team sports, like volleyball and futsal. It is worth saying, that an invaluable input in the sports hall

equipping was made by the staff members and procurement department under the lead of Chief Engineer Andrey Kozlov.

Beginning from 2017, Izolyator's futsal team is actively engaged in various regional and industry-related cups, reaching quite impressive positions in the final standings (with getting into prizes), taking into account its newby status. Behind the large organizational work to promote futsal in the company there are Mikhail Sheremetyev, Mechanical Shop Manager and Nikolay Borichev, PR & Marketing Director. In 2018, we continued the tradition of organizing a spring futsal cup from the 2017 to have a competition between the company divisions.

Volleyball players of our company are also improving their game. Our corporate team has not yet played in tournaments, but is getting prepared for a volleyball challenge between the company divisions, dedicated to the anniversary of our company with scheduled start in early June. This contest will show if our volleyball players are ready to face teams from other companies.

It is a wonderful trend that, with time, more and more company staff members are taking part in our corporate sports events. Further on, we plan to have the second stage of our multi-gym completed, equipping the second phase for weights lifting and ping-pong, offering our colleagues an opportunity to go in for sports in comfortable settings without traveling anywhere else after work, spending time and money on their favorite sports activities - as attendance of the sports facility and usage of its equipment are absolutely free for our staff!

In conclusion, we'd like to emphasize that in its over 120-year history, all Izolyator achievements were only made possible thanks to the well-coordinated work of a close-knit team of our professional staff. Preservation of the key staff over many years, with over a 100 labor dynasties entered in the annals of corporate history, with many of those people working at the plant todate, could not be possible without daily care about labor conditions and healthy lifestyle of our staff. By doing this, our company achieves the most efficient use by the staff members of their energy and talents in their professional activities and achievement of common corporate interests.



Volleyball team of Izolyator

THE PLANT RECEIVES ITS OWN SPORTS FACILITY

Opening of Sports Hall at Izolyator Plant



Alexander Slavinsky is opening the sports facility of Izolyator

On 8 February 2018, Izolyator opened a sports hall.

The modern sports facility was erected using own resources of the company following the strategy of sports and healthy lifestyles popularization among the staff of the plant.

Alexander Slavinsky, Chairman of the Board of Directors and Sergey Moisseev, General Director took part in the opening ceremony.

After the official part, the sports hall was opened by a friendly volleyball game between the teams of the company.

From now on, staff members can improve their skills in various competitive team sports, such as volleyball, futsal, ping pong, badminton and other game disciplines.

The sports hall also offers new opportunities of organization of various corporate competitions.

Improving of the staff members' health, promotion of a healthy lifestyle and strengthening of corporate team spirit are a priority in development of the company. The construction of the new sports hall coincided in time with the 10th Anniversary of the manufacturing complex of Izolyator, built in Pavlova Sloboda of the Moscow region.



Our volleyball teams are ready for the first in the sports hall's history match



Sports hall of Izolyator

The Science of Russia Futsal Cup 2018

On 25 March 2018, Izolyator's futsal team took part in the charity futsal cup the Science of Russia 2018 in Moscow.

The Science of Russia Cup is organized with support from the Ministry of Defense of Russian Federation. It attracts teams from the leading research organizations of Russia and the CIS countries. The cup is traditionally held twice a year: in spring and autumn.

In the Spartak academy arena n.a. F.F. Cheremkov, the Science of Russia 2018 Futsal Cup was held. It gathered 24 teams including a team from Belarus. So, we can say it had an international status.

This year's celebrity guest was Evgeny Savin, a famous broadcaster and TV show host. After warming-up, the master of the ceremony announced the opening of the cup. The organizers played Belarus's and Russia's national anthems and the teams took the field.



Izolyator team at the first tournament the Science of Russia 2018 futsal cup



The Science of Russia 2018 Cup prizes are waiting for the winners

Group F brought together Izolyator, Integral, Milandr and Optron.

The very first game in the group had an international status: Izolyator (Russia) played Vs Integral (Belarus) ending in the victory of the guests with 0:1 score. In the second game, ending in a tie, Optron and Milandr exchanged goals in the first half.

In the second round, Izolyator and Integral took over, playing more confidently than the players of Milandr and Optron.

However, the third round in Group F offered an unexpected turn: Optron and Milandr, being at the end of the standings, refused to give up and gave a battle in the Silver play-off. Optron took over in the match against Izolyator – 2:1.

In the result of the Group F games, Izolyator passed to the quarter finals of the Silver Cup of the tournament. After the games were played, the cup organizers interviewed players.

Gennady Rybakov, Izolyator:

- Would you please comment on your opponents and the level of your team on the tournament?

- We were able to gain the lead only in the silver play-offs – that means our rivals were stronger! Our team is based at the plant: we work there and after work we play ball. There is a sports facility at our plant now, where we train.

- Could you please share impressions on the event.

- The organization is wonderful! The locker rooms, shower areas, judging – everything was organized on a very well!! There's always something to say toward refereeing, but on our level, they manage to avoid mistakes.

- Thank you for participation and we wish you success at new tournaments!

We would like to congratulate Izolyator team with making it to the Silver play-offs of the tournament and thank all the supporters for their input.

For detailed coverage of the Science of Russia Futsal Cup 2018, please refer to the nearest issue of Izolyator corporate edition and the official pages of our company in social media.



Izolyator team is demonstrating both cooperative game and individual mastery of players

WE APPRECIATE ALL OUR PARTNERS



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IZOLYATOR SALES DIVISION IS INVITING TO SET UP COOPERATION IN ANY SUITABLE FORM FOR YOU



Thinking of becoming our partner?

We will provide exhaustive information on commercial, organizational, technical and other aspects of our company activities.

Do you need more information?

We will send you all materials of interest by email or in hard copy on your first request.

Would you like to visit the plant?

We will arrange an informative plant tour across all stages of the production process.

Do you prefer multimedia?

You can find Izolyator videos about the product range and key achievements on YouTube.

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